

Biodiversity surveys in the Forest Reserves of the Uluguru Mountains

Part I: An overview of the biodiversity of the Uluguru
Mountains

**Nike Doggart
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Dar es Salaam 2004

**A Report for:
The Wildlife Conservation Society of Tanzania (WCST)
The Uluguru Mountains Biodiversity Conservation Project in collaboration with
the
Uluguru Mountains Agricultural Development Project
The Regional Natural Resources Office, and the Regional Catchment Forest
Project
With support from the Tanzania Forest Conservation Group**

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In addition to the data collected during the present survey, information has been collated from other sources. These include:

Some of the data on the fauna of Kimboza and Uluguru North Forest Reserves were obtained from the Biodiversity Database of the Department of Zoology and Marine Biology, University of Dar es Salaam.

Some bird records for Uluguru North and Uluguru South Forest Reserves are from the research of Jens Otto Svendsen and Louis A. Hansen.

Some herpetological records for Uluguru North, Bunduki and Mkungwe Forest Reserves are from the work of Jean-Mariaux of the Geneva Museum.

Some zoological records for Kimboza Forest Reserves are based on a report by Rodgers et al. in 1983.

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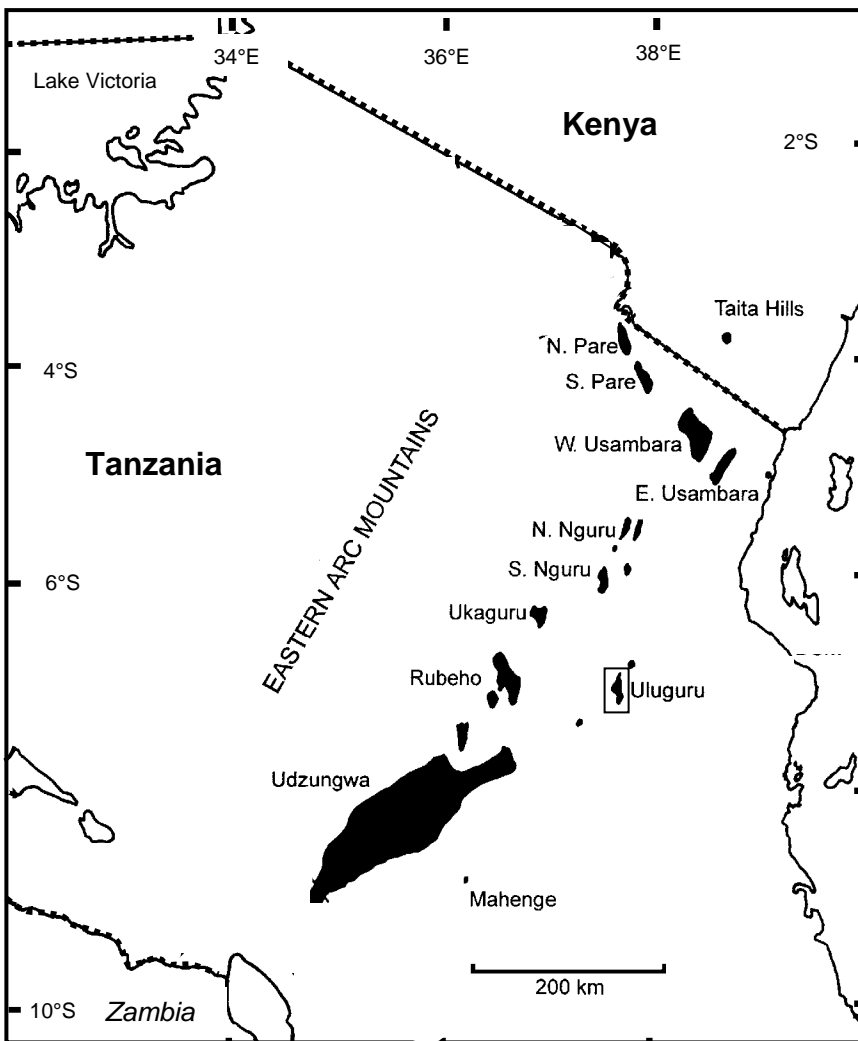
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Executive summary

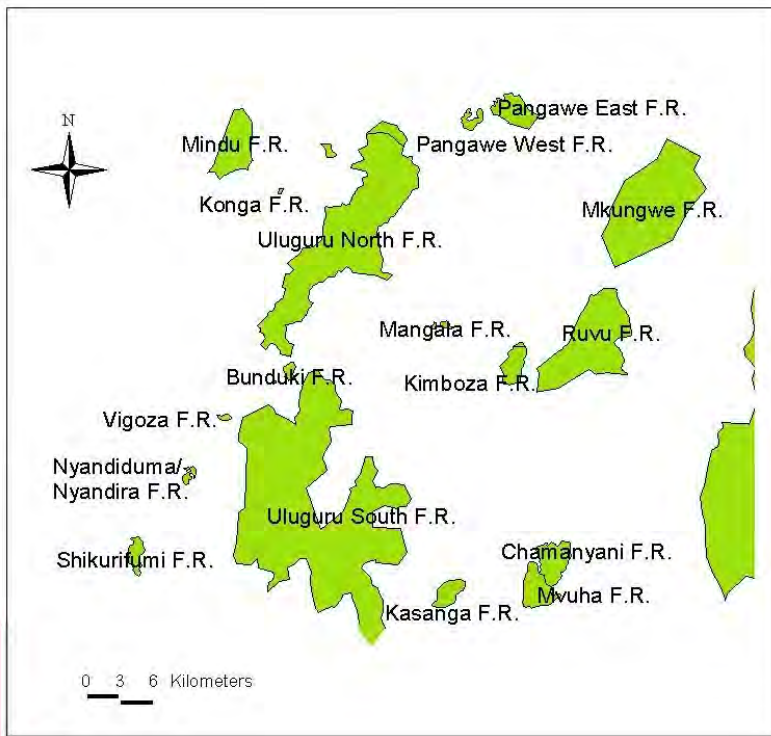
The Uluguru Mountains are part of the Eastern Arc Mountains, which stretch from southern Kenya to southern Tanzania. The importance of the Eastern Arc and Coastal forests to global biodiversity has been highlighted by various conservation organisations including Conservation International (Mittermeier et al. 1998; Myers et al. 2000), BirdLife International (ICBP 1992; Stattersfield et al. 1998) and the Worldwide Fund for Nature (Olson and Dinerstein 1998). The Eastern Arc contains 74 endemic vertebrate species of which 14 species and two sub-species are found only in the Uluguru Mountains. In addition there are more than 135 plant taxa endemic to the Ulugurus (Burgess et al. 2002).

Figure 1. Map of the Eastern Arc showing the location of the Ulugurus (modified from Burgess *et al.* 2002).



The Ulugurus are located within 180 km of the Indian Ocean. They rise dramatically from a lowland plain at approximately 200 m above sea level (asl) to 2638 m asl around the Lukwangule Plateau. Most of the remaining forest lies above 1500 m asl in the two largest Catchment Forest Reserves, Uluguru North and Uluguru South. Small patches remain at mid- and low- altitude in Catchment and Local Authority Forest Reserves. Most forest below 1500 m asl has been cleared for agriculture.

Figure 2. Map of the Forest Reserves of the Uluguru Mountains



This report gives an overview of the botanical and vertebrate biodiversity of the forests of the Uluguru Mountains. It includes the previously unpublished results of botanical and zoological surveys conducted during 2000 by the Uluguru Mountains Biodiversity Conservation Project, together with the results of a vegetation survey conducted in 1992 (Lovett and Pócs 1993), an ornithological study conducted in 1993 (Svendsen and Hansen 1995), a previous survey of Kimboza forest in 1993 (Frontier-Tanzania 1994) and selected historical data (Swynnerton and Hayman 1950). The report aims to provide an overview of the Uluguru biodiversity and to highlight priority areas for conservation in terms of their biodiversity and threat. The

report also lists species found in the Ulugurus that are at risk of extinction according to the global Red Data Book (www.redlist.org).

Surveys were conducted between 6th July – 5th September 2000 by a team from the Uluguru Mountains Biodiversity Conservation Project (UMBCP). The project is a collaboration between the Wildlife Conservation Society of Tanzania (WCST), the Danish Ornithological Society (DOF), the Uluguru Mountains Agricultural Development Project (UMADEP), the Regional Natural Resources Office (RNRO) and the Regional Catchment Forest Office (RCFO). The survey team visited 11 of the 22 Forest Reserves in the Ulugurus and surrounding areas. At each reserve the team made botanical collections and undertook an inventory of the mammals, birds, reptiles, amphibians and millipedes. The team also prepared a vegetation map of each reserve and recorded signs of resource use. Data were recorded using standardised forms and records are held on a Microsoft Access database held by WCST in Morogoro and at the University of Dar es Salaam.

The combination of data from the UMBCP surveys and those of other survey efforts show that the Ulugurus have both a high level of species richness and a high number of endemic species (Table 1).

Table 1. Summary of the species richness and endemism of the Uluguru Mountains

Taxon	Species richness	Endemics	Near endemics	No. species not recorded in the last 10 years
Plants	N/a	>135	N/a	N/a
Mammals	76	3*	10	30
Birds	140	2**	10	2
Reptiles	47	5*	16	12
Amphibians	44	6	18	2
Total	307	16	54	46

*Includes one sub-species. ** If *Andropadus neumanii* is accepted, this would be three endemic species of birds.

The UMBCP surveys recorded a number of vertebrate species not previously confirmed from the Ulugurus including the bat *Myonycteris relicta*, the rodent *Beamys hindei*, the chameleon *Chamaeleo deremensis* and the snake *Atheris ceratophorus*.

At least 48 vertebrate species have not been recorded from the Ulugurus during the last decade. The majority of these species are mammals, which probably reflects low survey intensity rather than their absence from the area. However it is possible that some animals previously recorded in the Ulugurus are no longer present. Of greatest concern are those species endemic to the Ulugurus that have not been recorded during the last 10 years as it is possible that they are now extinct. During the UMBCP surveys four such endemic species were not located: a sub-species of golden mole *Chrysochloris stuhlmanni tropichalis*, the snakes *Typhlops uluguruensis* and *Prosymna ornatissima* and the amphibian *Hyperolius tornieri* (although the validity of this last species has been questioned). Of greatest concern were the low and mid-altitude endemics *Prosymna ornatissima* and *Typhlops uluguruensis* as habitat loss has been most severe across the mid- and low altitudes of the Ulugurus (Burgess *et al.* 2002). However, since the UMBCP surveys were completed a specimen of *T. uluguruensis* has been collected near Uluguru North, hence this species is confirmed to persist (S. Loader pers. com.)].

The Ulugurus have suffered an extensive loss, fragmentation and degradation of large areas of forest. The principle cause of forest loss and fragmentation is the expansion of agricultural land. This has been most intense below 1800 m. Pitsawing, mining and fire are still degrading the few remaining patches of lowland forest. Most of the forest loss has been outside of the government controlled Forest Reserves, however recently there has been forest clearance within local authority reserves such as Mangala.

1) Introduction

1.1 Background to the Uluguru Mountains

The Uluguru Mountains are one of twelve mountain ranges that comprise the Eastern Arc. The Eastern Arc is a chain of block-faulted, crystalline mountains under the climatic influence of the Indian Ocean (Lovett 1985). The Ulugurus are on the seaward side of the arc, 180 km west of the



Indian Ocean. Other mountain ranges in the Eastern Arc, from north to south, are the Taita, North and South Pare, East and West Usambara, Nguu, Nguru, Ukaguru, Rubeho, Udzungwa and Mahenge Mountains.

The main Ulugurus block stretches 45 km along a north-south axis. Uluguru South rises to 2638 m above sea level (asl) around the Lukwangule plateau with a second peak at Kimhandu (2634 m asl) further south. Uluguru South is divided from Uluguru North by the Bunduki gap, a now largely deforested saddle between the two main ridges. The mountains rise abruptly from the lowland plains and are characterised by rock outcrops and steep slopes.

Figure 3. Location of the Uluguru Mountains

Foothills divide the main mountain range from the lowland plains that reach towards the Selous, Mikumi and the coast. To the east the mountains drop steeply to 500 m asl, there is then a band, 10 – 26 km wide, of gentle hills. Most are between 200 – 500 m asl with peaks at Mkungwe (1100 m asl) and Luhakwe (900 m asl). The land then descends to the lowland plain that stretches towards the coast. In the south-east there is a sudden drop in altitude towards the Mbahana River. Beyond this river there is an extensive complex of low hills dropping towards the Great Ruaha and Rufiji flood plains. In the North of the range the mountains drop from 2000 m asl to 580 m asl within 4 km. A lowland plain extends beyond this precipitous drop rising again to 1260 m asl at Mindu Mountain.

The Uluguru Mountains and their foothills are a mosaic of forest, woodland, cultivation and grassland. Forest is most extensive above 1500 m asl in Uluguru North and South Forest Reserves. At lower altitudes submontane and lowland forest exists as fragments in a matrix of agricultural land. Most remaining forest is found within Forest Reserves. Woodland is extensive on the drier foothills with *Brachystegia* sp. dominant in the moister areas giving way to *Acacia* sp. woodland in the drier areas. Cultivation ranges from maize and cassava at lower altitudes to a mix of vegetables and bananas higher up. The Lukwangule Plateau has the most extensive natural grasslands and is dominated by the endemic grass *Panicum lukwangulense*. Other areas of grassland exist in the lowlands; formerly these areas may have been under cultivation and before that forest or woodland.

The Ulugurus are the source of water for two of Tanzania's major cities. The Ngerengere and Morogoro Rivers, whose headwaters are in Uluguru North, provide water for the regional capital, Morogoro before flowing into the Ruvu River. The Ruvu River, which drains Uluguru North and South, supplies water to Tanzania's largest city, Dar es Salaam.

The Eastern Arc and coastal forests have the highest concentration of endemic vertebrates of any terrestrial habitat in the world (Myers et al. 2000). At a global scale they have been recognised as a priority for biodiversity conservation in several priority-setting analyses (Mittermeier et al. 1998; Olson and Dinerstein 1998; Stattersfield et al. 1998). A recent compilation indicated that

there are at least 74 vertebrate taxa endemic to the Eastern Arc of which 16 are found only in the Uluguru Mountains (Burgess et al. 1998a).

Recent research on the biodiversity of the Ulugurus includes a description of the vegetation of the catchment Forest Reserves (Lovett and Pócs 1993) and a summary report on the fauna of Uluguru North and South (Svendsen and Hansen 1995). Data on small mammals and galagos have been presented by Stanley *et al.* (1998) and Perkin (2000) respectively. The herpetofauna has been less well documented. An early inventory was made by Barbour and Loveridge (1928) and subsequent visits have been made by K. Howell (unpubl.), A. Channing (unpubl.), J. Mariaux (unpubl.), amongst others. A brief overview of Uluguru biodiversity values and the impact of habitat loss has been presented by Burgess et al. (2002).

1.2 Report structure

The report is divided into two parts. The first part is an overview of the results of the UMBCP surveys in year 2000, combined with results from other selected surveys. The second part includes individual descriptions of the 11 reserves covered by the UMBCP survey.

Part I has seven sections. Sections 1 - 3 describe the aims and methods of the survey. Section 4 presents the results as a summary for all reserves. This is followed by sections 5 – 7 which include a discussion, conclusion and management recommendations.

1.3 Data storage

Data are stored in two Microsoft Access databases currently housed at the WCST Uluguru Mountains Biodiversity Conservation Project office in Morogoro, at the University of Dar es Salaam and with two of the authors, Nike Doggart and Neil Burgess. One database contains details of the plant specimens, the second contains data on zoological specimens. As the role of the databases is to keep records of the botanical and zoological specimens they do not include records of sightings hence there are few data on birds and large mammals. These databases also include a summary of the legal status of each reserve, and some other management issues (for example transects of forest disturbance, and a boundary survey of Uluguru North Forest Reserve).

Zoological data was recorded using standardised forms taken from the database.

The botanical database has two tables. The specimen table includes the following fields:

Identification

- Specimen number
- Duplicate number
- Family
- Genus
- Species
- Sub-species
- Specimen description

Collecting locality

- Country
- First political division
- Next political division
- FTEA region
- General locality
- Collection site
- Altitude

- Habitat

Collection Date

The annotated species list includes the following fields:

- Family
- Genus
- Species
- Subspecies
- Author
- Altitudinal range
- Distribution
- Life form
- Notes
- Data Source

Information on altitudinal range, distribution, life form and author are taken from the Flora of Tropical East Africa, the List of East African Plants or TROPICOS. The source of this information is cited in the 'data source' field.

The zoological database has separate tables for mammals (not bats), bats, birds, reptiles and amphibians. Each table includes the following fields:

Collection details

- Forest Reserve
- Longitude
- Latitude
- KMH number
- Collector
- Collection date

Identification

- Genus
- Species
- Subspecies
- Capture method
- Determiner
- Determination date

Habitat

- Altitude
- Slope
- Aspect
- Topography
- Vegetation type
- Vegetation cover (tree canopy, ground layer and shrub layer)
- Microhabitat
- Forest edge / gap
- Canopy height
- Microhabitat
- Water association

Specimen description

- Sex
- Age

- Biometrics
- Colour notes
- Reproductive state

Zoological data is also stored within the National Biodiversity Database at the University of Dar es Salaam. This is also a Microsoft Access database.

The purpose of the databases is primarily for data storage however they can also be used for analysis. Using the query tools available in Microsoft Access it is possible to extract information relating to selected areas or species.

A guide to using the databases is available from the Uluguru Mountains Biodiversity Conservation Project (Doggart 2001) at <http://www.africanconservation.com/uluguru>.

2) Aims

The principal aim of the Uluguru Mountains Biodiversity Conservation Project (UMBCP) survey was to visit a number of smaller forest patches in the vicinity of the main Uluguru North and Uluguru South Forest Reserves to assess their biodiversity values. Specifically, for each reserve to produce:

- a sketch map of the vegetation cover of the reserve;
- a collection of the plants flowering or fruiting in each reserve;
- a list of the birds in the reserve, with collection of reference specimens and DNA samples of selected taxa;
- a list of the mammals, amphibians and reptiles.

However, in addition to the field surveys, we have also compiled records for Uluguru South and Uluguru North Forest Reserves to provide an overview of the current knowledge of the species of the Uluguru Mountains range.

3) Methods

3.1 Botanical

3.1.i Collection of botanical specimens

Specimens were taken of all species fruiting or flowering at the time of the surveys. Collections were made of trees, shrubs, herbs, lianas and vines. For each specimen notes were made on the locality, habitat and local name. The form and colour of the plant was also described. Where possible five duplicates were collected for each specimen. These have been sent to:

1. Kew Royal Botanical Gardens
2. Missouri Botanical Gardens
3. University of Dar es Salaam
4. National Herbarium, Arusha, Tanzania
5. University of Copenhagen

3.1.ii Vegetation mapping

Vegetation was classified according to Lovett and Pócs (1993). See 1.2.5 for details. The extent of each habitat was recorded using photographs, walking extensively through the reserve and making notes from view points such as hill tops and the forest edge. Using a global positioning system (GPS) device, the edges of each habitat were recorded wherever possible.

3.2 Zoological

3.2.i Large mammals

During extensive walks through the forest all encounters with large mammals were recorded. Discussions were also held with villagers familiar with the forest. Kingdon's (1997) guide to African mammals was used as a prompt. In general only those species that are abundant according to villagers' opinion have been included. The reliability of informants was determined by asking about the presence of species that do not occur in Tanzania. If informants stated that non-Tanzanian species were present then their accounts were disregarded.

Nomenclature for all mammals follows Kingdon (1997).

3.2.ii Galagos

Recordings were made of bushbaby calls using a Sony WM-C6C tape recorder and a directional microphone. Observations were made using a Petzl head torch with a halogen bulb. A Chardonneret trap was used to capture galagos alive. The traps were baited with coconut wine and / or bananas.

3.2.iii Small mammals (not bats)

Rodents and shrews were caught using bucket pitfall traps. Three 50 m lines of drift fencing, each with 11 buckets at 5 m intervals were erected perpendicular to the slope.

3.2.iv Bats

Bats were collected using mist nets strung across bat flyways such as streams and paths. Nets were opened at dusk and checked regularly while open.

3.2.v Birds

Birds were surveyed using a combination of mist netting and observations. Nets were opened just before dawn and were closed at dusk. Birds were identified using a combination of Britton (1981), Zimmerman *et al.* (1997) and van Perlo (1995). The ornithologist, Jacob Kiure provided the identifications. Blood samples were taken from selected forest dependent species for analysis at the Zoological Museum at the University of Copenhagen (ZMUC). Two unusual akalats were taken as specimens from Milawilila Forest Reserve and these were confirmed by Prof. J. Fjeldså to belong to the new species *Sheppardia aurantiithorax* (Beresford *et al.* 2004). Observation walks usually occurred between 07:30 and 10:30, but observations were also made at other times.

3.2.vi Reptiles

Reptiles were recorded using bucket pitfall traps and through diurnal and nocturnal walks. During the diurnal walks the focus was on species living in the leaf litter and under rotting logs. At night the focus was on chameleons and other species living in the lower branches of trees. Discussions were also held with local people to determine the presence of distinctive species such as rock python, puff adder and *Prosymna ornatissima*.

3.2.vii Amphibians

Amphibians were recorded using bucket pitfall traps and through diurnal and nocturnal walks. During the diurnal walks the focus was on species living in the leaf litter and under rotting logs. At night the focus was on tree frogs and other species living in the lower branches of trees.

3.2.viii Millipedes

Millipedes were collected opportunistically by looking under logs and in the leaf litter.

4) Results

4.1 Survey dates

Eleven Forest Reserves were visited between 6.7.2000 and 5.9.2000. Visits varied in length from 1 to 16 days depending on the size of the reserve.

Table 2. Timetable of visits to target Forest Reserves¹.

Forest Reserve	Dates
Mkungwe	6.7 - 13.7 and 9.8 - 16.8
Ruvu	13.7 - 20.7
Mvuha / Chamanyani	20.7 - 27.7
Kasanga	27.7 - 3.8
Uluguru South (nr Kimhandu)	5.8 - 7.8
Mangala	16.8 - 20.8
Milaliwilila	20.8 - 21.8
Ngambaula	21.8 - 23.8
Shikurufumi	24.8 - 27.8
Bunduki	28.8 - 31.8
Uluguru South (nr Tchenzema)	31.8 - 4.9
Konga	5.9

4.2 Botanical

A total of 504 botanical specimens were collected during the UMBCP surveys from ten reserves (Table 3). Of the 504 specimens collected, 408 have been identified to species level. The collection includes specimens from 381 species in 81 families.

Collections were made by Boniface Mhoro. Identifications have been provided by Dr. Roy Gereau from the Missouri Botanical Gardens and by Dr. Kaj Vollesen from the Royal Botanic Gardens, Kew.

Table 3. Botanical sampling intensity.

Forest Reserve	Botanical specimens
Bunduki	33
Kasanga	71
Konga	4
Mangala	29
Mkungwe	121
Milaliwilila	26
Mvuha / Chamanyani	76
Ngambaula	18
Ruvu	83
Shikurufumi	43
Total	504

In Appendix I the list of species collected during the UMBCP surveys is presented with a brief summary of their distribution, altitudinal range, habitat and life form. The source of this summary data is listed in the final column.

4.3 Zoology

Sampling intensity is described in Table 4. The sampling intensity varied according to the size of the reserve, time available and field staff present.

¹ All dates follow the European format i.e. day / month.

Table 4. Zoological sampling intensity.

Forest Reserve	Bucket pitfall nights ¹	Nocturnal survey (hrs)	Diurnal survey (hrs)	Bird netting (m x hrs)	Bat netting (hrs)	Bushbaby trap nights ²
Bunduki	0	5	7	78 m x 12 hrs	0	0
Kasanga	5	4	12	0	0	0
Konga	0	0	2	0	0	0
Mangala	0	3	4	102 m x 6 hrs	0	0
Mkungwe	5	25	20	108 m x 54 hrs	8	14
Milaliwilila	0	0	3	102 m x 6 hrs	12	0
Mvuha / Chamanyani	0	4	12	108 m x 72 hrs and 48 m x 36 hrs	12	1
Ngambaula	0	2	7	102 m x 15 hrs	12	0
Ruvu	4	12	10	96 m x 60 hrs	0	2
Shikurufumi	0	4	8	0	0	0
Uluguru South (nr Kimhandu)	0	3	6	0	0	0
Uluguru South (nr Tchenzema)	0	6	6	n/a	0	6

¹ On each night 33 bucket pitfalls were used.

² Each trap night represents one trap set for 12 hours. Between one and three traps were set on any one night.

4.3.1 Mammals

At least 76 mammal species from 26 families have been recorded in the Uluguru Mountains since 1950. Of these, at least 32 species were recorded during the UMBCP surveys in 2000 although some specimens have not yet been identified. Stanley et al. (1998) recorded an additional nine small mammal species. A further 30 species have not been recorded since 1950. In the case of the ten bat species that have not been recorded recently this may be due to low sampling intensity. For other species such as bushbuck and some of the rodents, their absence in recent surveys may be due to low sampling intensity in the woodland habitats. Finally, in the case of the Stuhlmann's golden mole it may be due to habitat loss or to the cryptic nature of this species, which makes it difficult to record.

Ranges are based on Burgess et al. (1998a), Burgess et al. (1998b), Kingdon (1997) and Perkin (2000). Habitat is based on Kingdon (1997).

Provisional identifications of the UMBCP collection have been provided by Dr. W. Stanley and Prof. K. M. Howell. Specimens have been deposited at the University of Dar es Salaam and at the Field Museum of Natural History, Chicago.

Table 5. Checklist of mammals of the Ulugurus.

Species	Common name	Range	Habitat	Most recent record
COLOBIDAE				
<i>Colobus angolensis</i>	Angola pied colobus	Widespread	F	UMBCP 2000
CERCOPITHECIDAE				
<i>Papio cynocephalus</i>	Yellow baboon	Widespread	F	UMBCP 2000
<i>Cercopithecus aethiops</i>	Savannah monkey	Widespread	F	UMBCP 2000
<i>Cercopithecus mitis</i>	Blue monkey	Widespread	F	UMBCP 2000
GALAGONIDAE				
<i>Otolemur garnettii</i>	Small-eared galago	Coastal forests, Eastern Arc and Kilimanjaro	F	UMBCP 2000
<i>Galagoides zanzibaricus</i>	Zanzibar galago	Coastal forests and Eastern Arc	FF	UMBCP 2000
<i>Galagoides orinus</i>	Usambara galago	Eastern Arc	FF	UMBCP 2000
PTEROPODIDAE				
<i>Lissonycteris angolensis</i>	Angola fruit bat	Widespread	F	UMBCP 2000

		Lowland E. Arc, Coastal Forests and outlier in Zimbabwe	F	UMBCP 2000
<i>Myonycteris relicta</i>	Collared fruit bat			
<i>Epomophorus wahlbergi</i>	Epauletted fruit bat	Wildespread	F	Frontier-Tanzania 1994
NYCTERIDAE				
<i>Nycteris thebaica</i>	Slit-faced bat	Widespread		Swynnerton and Hayman 1950
<i>Nycteris hispida</i>	Slit-faced bat	Widespread		Swynnerton and Hayman 1950
RHINOLOPHINAE				
<i>Rhinolophus landeri lobatus</i>	Horseshoe bat	Widespread		Swynnerton and Hayman 1950
<i>Rhinolophus clivosus</i>	Horseshoe bat	Widespread		UMBCP 2000
<i>Rhinolophus hildebrandti</i>	Horseshoe bat	Widespread		Frontier-Tanzania 1994
HIPPOSIDERIDAE				
<i>Hipposideros caffer caffer</i>	Leaf-nosed bat	Widespread		Swynnerton and Hayman 1950
VESPERTILIONIDAE				
<i>Myotis welwitschii venustus</i>	Hairy bat	Widespread		Swynnerton and Hayman 1950
<i>Kerivoula africana</i>	Woolly bat	Lowland E. Arc and Coastal Forests		Swynnerton and Hayman 1950
<i>Chalinolobus argentatus</i>	Butterfly bat	Widespread		Swynnerton and Hayman 1950
<i>Pipistrellus kuhlii fuscatus</i>	Pipistrelle	Widespread		Swynnerton and Hayman 1950
<i>Pipistrellus nanus</i>	Pipistrelle	Widespread		UMBCP 2000
<i>Scotophilus viridis viridis</i>	House bats	Widespread		Frontier-Tanzania 1994
<i>Miniopterus schreibersi</i>	Long-fingered bats	Widespread		Swynnerton and Hayman 1950
CHRYSOCHLORIDAE				
<i>Chrysochloris stuhlmanni tropicalis</i>	Stuhlmann's golden mole	Sub-species endemic to Uluguru		Swynnerton and Hayman 1950
SORICIDAE				
<i>Crocidura hirta</i>	White-toothed shrew	Widespread		Swynnerton and Hayman 1950
<i>Crocidura monax</i>	White-toothed shrew	Eastern Arc, Kilimanjaro and one other site.		Stanley et al. 1998
<i>Crocidura olivieri</i>	White-toothed shrew	Widespread		Stanley et al. 1998
<i>Crocidura telfordi</i>	White-toothed shrew	Uluguru	FF	Stanley et al. 1998
<i>Myosorex geata</i>	Mouse shrew	Uluguru	FF	Swynnerton and Hayman 1950
<i>Sylvisorex howelli</i>	Climbing shrew	Usambara and Uluguru	FF	Stanley et al. 1998
<i>Sylvisorex megalura</i>	Climbing shrew	Widespread		Stanley et al. 1998
MACROSCOLIDINAE				
<i>Petrodromus tetradactylus</i>	Four toed elephant shrew	Widespread	F	UMBCP 2000
RHYNCHONCYONINAE				
<i>Rhynchocyon petersi</i>	Zanj elephant shrew	S. Pare, Usambara, Uluguru, Nguru?, Coastal Forests	F	UMBCP 2000
SCIURIDAE				
<i>Paraxerus lucifer</i>	Tanganyika mountain squirrel	Widespread	FF	UMBCP 2000
<i>Paraxerus palliatus</i>	Red-bellied coast squirrel	Widespread	F	Swynnerton and Hayman 1950
<i>Paraxerus ochraceus</i>	Ochre bush squirrel	Widespread	F	UMBCP 2000
<i>Paraxerus flavovittis</i>	Striped bush squirrel	Widespread	F	UMBCP 2000
ANOMALURIDAE				
<i>Anomalurus derbianus</i>	Lord Derby's anomalure	Widespread	F	Swynnerton and Hayman 1950
DENDROMURINAE				
<i>Dendromus sp.</i>	Climbing mouse			UMBCP 2000

<i>Dendromys mesomelas</i>	Climbing mouse	Widespread	O	Swynnerton and Hayman 1950
CRICETOMYINAE				
		Usambara, Uluguru, Udzungwa, Nguru and Pare (and Coastal Forests)		
<i>Beamys hindei</i>	Lesser pouched rat		F	UMBCP 2000
<i>Cricetomys gambianus</i>	Giant pouched rat	Widespread	F	Swynnerton and Hayman 1950
OTOMYINAE				
<i>Otomys denti</i>	Groove-toothed rat	Widespread	O	Swynnerton and Hayman 1950
MURIDAE				
<i>Acomys spinosissimus</i>	Spiny mouse	Widespread	O	Frontier-Tanzania 1994
	Brush-furred			
<i>Lophuromys sikapusi</i>	mouse	Widespread	F	Swynnerton and Hayman 1950
<i>Lophuromys flavopunctatus</i>	Brush-furred mouse	Widespread	F	Stanley et al. 1998
<i>Praomys jacksoni</i>	Soft-furred rat	Widespread	F	Swynnerton and Hayman 1950
<i>Praomys delectorum</i>	Soft-furred rat		F	Stanley et al. 1998
	African wood mouse		F	Stanley et al. 1998
<i>Hylomyscus denniae</i>	mouse		F	Stanley et al. 1998
<i>Mastomys natalensis</i>	Multimammate rat	Widespread	F	UMBCP 2000
<i>Mus sp.</i>	Common mouse	Widespread		UMBCP 2000
	Narrow-footed woodland mouse	Widespread		UMBCP 2000
<i>Grammomys sp.</i>	Narrow-footed woodland mouse	Widespread	F	Frontier-Tanzania 1994
<i>Grammomys macmillani</i>	Narrow-footed woodland mouse		F	Stanley et al. 1998
<i>Grammomys ibeanus</i>	woodland mouse		F	Stanley et al. 1998
<i>Dasymys incomtus</i>	Shaggy swamp rat	Widespread	O	Swynnerton and Hayman 1950
<i>Pelomys fallax</i>	Creek rat	Widespread	O	Swynnerton and Hayman 1950
MUSTELIDAE				
	African clawless otter	Widespread	F	Swynnerton and Hayman 1950
<i>Aonyx capensis</i>	otter		F	Swynnerton and Hayman 1950
HERPESTIDAE				
<i>Mungos mungo</i>	Banded mongoose	Widespread	O	UMBCP 2000
VIVERRIDAE				
<i>Genetta sp.</i>	Genet			UMBCP 2000
<i>Genetta tigrina</i>	Blotched genet	Widespread	F	UMBCP 2000
<i>Civettictis civetta</i>	African civet	Widespread	F	UMBCP 2000
<i>Leptailurus serval</i>	Serval cat	Widespread	O	Swynnerton and Hayman 1950
NANDININAE				
<i>Nandinia binotata</i>	African palm civet	Widespread	F	UMBCP 2000
FELIDAE				
<i>Panthera pardus</i>	Leopard	Widespread	F	UMBCP 2000
<i>Panthera leo</i>	Lion	Widespread	O	UMBCP 2000
PROCAVIDAE				
<i>Dendrohyrax sp.</i>	Tree hyrax		F	UMBCP 2000
SUIDAE				
<i>Potamochoerus larvatus</i>	Bush pig	Widespread	F	UMBCP 2000
BOVIDAE				
<i>Tragelaphus scriptus</i>	Bushbuck	Widespread	F	Swynnerton and Hayman 1950
<i>Cephalophus monticola</i>	Blue duiker	Widespread	FF	UMBCP 2000
<i>Cephalophus harveyi</i>	Harvey's duiker	Widespread	FF	UMBCP 2000
		Udzungwa, Usambara?, Uluguru, Udzungwa, Rungwe and Kilimanjaro		
<i>Cephalophus spadix</i>	Abbot's duiker		FF	UMBCP 2000
<i>Neotragus moschatus</i>	Suni	Widespread	F	Swynnerton and Hayman 1950

Key to Table 5

The habitat preference of each species is described in the habitat column as:
 FF = Species dependent on primary forest only. It does not include forest edge or secondary forest species;
 F = Forest dwelling but not dependent on primary forest: species occurring in primary forest as defined above as well as other vegetation types. It should be emphasised that many of these species are still dependent on a forest habitat albeit forest edge or disturbed forest. Most species in this category will still be adversely affected by forest destruction.
 O = These are species that do not normally occur in primary or secondary forest or forest edge.

4.3.2 Birds

A total of 140 species from 40 families have been recorded in the Uluguru Mountains (Table 6). Of these 128 species have been recorded in the last ten years either by the UMBCP surveys or by Svendsen and Hansen (1995). Rodgers et al. (1983) recorded an additional ten species in Kimboza Forest Reserve. *Ploceus nicolli* and *Anthreptes rubritorques* have not been recorded recently which suggests that they may now be extinct in the Uluguru.

Ranges are based on Burgess et al. (1998a), van Perlo (1995) and Svendsen and Hansen (1995). Habitat association is based on Zimmerman (1999) and van Perlo (1995).

Table 6. Checklist of birds of the Uluguru.

Species	Common name	Range	Habitat	Most recent record
SCOPIDAE				
<i>Scopus umbretta</i>	Hamerkop	Widespread	O	UMBCP 2000
THRESKIORNITHIDAE				
<i>Bostrychia hagedash</i>	Hadada ibis	Widespread	F	UMBCP 2000
ANATIDAE				
<i>Anas sparsa</i>	Africa black duck	Widespread	F/FF	Svendsen and Hansen 1995
ACCIPITRIDAE				
<i>Pernis apivorus</i>	Honey buzzard	Widespread palearctic migrant	O/F	Svendsen and Hansen 1995
<i>Macheiramphus alcinus</i>	Bat hawk	Widespread	O	Svendsen and Hansen 1995
<i>Circaetus fasciolatus</i>	Southern banded snake eagle	Wide range but localised	F/O	UMBCP 2000
<i>Terathopius ecaudatus</i>	Bateleur	Widespread	O	UMBCP 2000
<i>Micronisus gabar</i>	Gabar goshawk	Widespread	O	Svendsen and Hansen 1995
<i>Polyboroides typus</i>	African harrier hawk	Widespread	F	UMBCP 2000
<i>Accipiter tachiro</i>	African goshawk	Widespread	F	UMBCP 2000
<i>Accipiter minullus</i>	Little sparrowhawk	Widespread	F	UMBCP 2000
<i>Accipiter melanoleucus</i>	Great sparrowhawk	Widespread Widespread in highlands of eastern half of the continent	O/F	Svendsen and Hansen 1995
<i>Buteo oreophilus</i>	Mountain buzzard	Widespread palearctic migrant	F/FF	UMBCP 2000
<i>Buteo (buteo) vulpinus</i>	(Common) Steppe buzzard	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Gypohierax angolensis</i>	Palm-nut vulture	Widespread	O/F	UMBCP 2000
<i>Stephanoaetus coronatus</i>	African crowned eagle	Widespread	FF	UMBCP 2000
<i>Aquila nipalensis</i>	Steppe eagle	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Aquila wahlbergi</i>	Wahlberg's eagle	Widespread	O	Svendsen and Hansen 1995
<i>Hieraaetus spilogaster</i>	Booted eagle	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Lophaetus occipitalis</i>	Long-crested eagle	Widespread	O	Svendsen and Hansen 1995
<i>Falco naumanni</i>	Lesser kestrel	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Falco biarmicus</i>	Lanner falcon	Widespread	O	Svendsen and Hansen 1995
<i>Falco peregrinus</i>	Peregrine falcon	Widespread & migrants; several subspecies are involved	O	Svendsen and Hansen 1995
NUMIDIDAE				

Species	Common name	Range	Habitat	Most recent record
<i>Guttera pucherani</i>	Crested guineafowl	Widespread	F/O/FF	UMBCP 2000
RALLIDAE				
<i>Sarothrura elegans</i>	Buff-spotted flufftail	Widespread	F	Svendsen and Hansen 1995
SCOLOPACIDAE				
<i>Tringa hypoleucos</i>	Common sandpiper	Widespread palearctic migrant	O	UMBCP 2000
COLUMBIDAE				
<i>Turtur tympanistria</i>	Tambourine dove	Widespread	F/FF	UMBCP 2000
<i>Turtur afer</i>	Blue-spotted wood dove	Widespread	F/O	UMBCP 2000
<i>Turtur chalcospilos</i>	Emerald-spotted wood dove	Widespread	F/O	Svendsen and Hansen 1995
<i>Treron calva</i>	Green pigeon	Widespread	F/O	Svendsen and Hansen 1995
<i>Columba delegorguei</i>	Eastern bronze-naped pigeon	Localised in eastern half of the continent	FF/F	UMBCP 2000
<i>Columba arquatrix</i>	Olive pigeon	Widespread in highlands	FF/F	UMBCP 2000
<i>Aplopelia larvata</i>	Lemon dove	Widespread	FF/F	UMBCP 2000
<i>Streptopelia semitorquata</i>	Red-eyed dove	Widespread	O	UMBCP 2000
PSITTACIDAE				
<i>Poicephalus robustus</i>	Brown-necked parrot	Widespread	O/F	UMBCP 2000
MUSOPHAGIDAE				
<i>Tauraco livingstonii</i>	Livingstone's turaco	Widespread from C Kenya via Tanzania to E Zambia, Malawi to S Mozambique	FF	UMBCP 2000
CUCULIDAE				
<i>Cercococcyx montanus</i>	Barred long-tailed cuckoo	Widespread	FF/F	Svendsen and Hansen 1995
<i>Chrysococcyx klaas</i>	Klaas's cuckoo	Widespread	F	Svendsen and Hansen 1995
<i>Ceuthmochares aereus</i>	Yellowbill	Widespread	F/FF	UMBCP 2000
<i>Centropus superciliosus</i>	White-browed coucal	Widespread	O/F	Svendsen and Hansen 1995
STRIGIDAE				
<i>Bubo lacteus</i>	Verreaux's eagle-owl	Widespread	O	UMBCP 2000
<i>Bubo vosseleri</i>	Usambara eagle-owl	E. Usam., Ulug., & Udz.	FF	UMBCP 2000
<i>Strix woodfordii</i>	African wood owl	Widespread	F/FF	UMBCP 2000
<i>Glaucidium capense</i>	African barred owl	Widespread	O	Rodgers et al. 1983
APODIDAE				
<i>Schoutedenapus myoptilus</i>	Scarce swift	Wide range but localised in highlands	F/FF	Svendsen and Hansen 1995
<i>Cypsiurus parvus</i>	African palm swift	Widespread	O	UMBCP 2000
<i>Apus affinis</i>	Little swift	Widespread	O	UMBCP 2000
<i>(Apus niansae)</i>	(Nyanza swift)	Localised in highlands of E and N Africa	O/F	(Some doubt over this record). Svendsen and Hansen 1995
<i>Apus caffer</i>	White-rumped swift	Widespread	O	Svendsen and Hansen 1995
<i>Tachymarptis aequatorialis</i>	Mottled swift	Widespread	O	Svendsen and Hansen 1995
<i>Telacanthura ussheri</i>	Mottled spinetail	Widespread	O	Rodgers et al. 1983
<i>Neafrapus boehmi</i>	Bohm's spinetail	Widespread	O/F	Stuart and Jensen 1985
COLIIDAE				
<i>Colius striatus</i>	Speckled mousebird	Widespread	O	Svendsen and Hansen 1995
TROGONIDAE				
<i>Apaloderma narina</i>	Narina's trogon	Widespread Eastern Africa, Albertine Rift & Cameroon Mts	FF	UMBCP 2000
<i>Apaloderma vittatum</i>	Bar-tailed trogon		FF	UMBCP 2000
ALCEDINIDAE				
<i>Alcedo semitorquata</i>	Half-collared kingfisher	Widespread	O/F	UMBCP 2000
<i>Ispidina picta</i>	African pygmy kingfisher	Widespread	O/F	UMBCP 2000
<i>Megaceryle maxima</i>	Giant kingfisher	Widespread	F	UMBCP 2000
MEROPIDAE				
<i>Merops apiaster</i>	European bee-eater	Widespread palearctic migrant	O	Svendsen and Hansen 1995

Species	Common name	Range	Habitat	Most recent record
CORACIIDAE				
<i>Eurystomus glaucurus</i>	Broad-billed roller	Widespread	O	Svendsen and Hansen 1995
PHOENICULIDAE				
<i>Phoeniculus purpureus</i>	Green wood-hoopoe	Widespread	FF/F	UMBCP 2000
BUCEROTIDAE				
<i>Tockus alboterminatus</i>	Crowned hornbill	Widespread	F/FF	UMBCP 2000
<i>Bycanistes bucinator</i>	Trumpeter hornbill	Widespread	F/FF	UMBCP 2000
<i>Bycanistes brevis</i>	Silvery-cheeked hornbill	Widespread in eastern half of the continent	F/FF	UMBCP 2000
CAPITONIDAE				
<i>Stactolaema leucotis</i>	White-eared barbet	Mainly in Eastern Arc lowlands & Coastal forests Very localised in a few coastal forests and mountains from SE Kenya, Tanz., N&S Malawi, N Moz. and Ngoye Forest in NE S. Africa	F	UMBCP 2000
<i>Stactolaema olivacea</i>	Green barbet	Very localised in few coastal forest and lowlands from SE Kenya, Tanz., S Malawi & S Moz.	FF	UMBCP 2000
<i>Pogoniulus simplex</i>	Eastern green tinkerbird	Localised in highlands from C Kenya, Tanz. to S Malawi	FF	UMBCP 2000
<i>Pogoniulus leucomystax</i>	Moustached green tinkerbird		FF	Svendsen and Hansen 1995
<i>Pogoniulus bilineatus</i>	Yellow-rumped tinkerbird	Widespread	FF/F	UMBCP 2000
<i>Tricholaema lacrymosa</i>	Spot-flanked barbet	Widespread	O	Svendsen and Hansen 1995
INDICATORIDAE				
<i>Indicator variegatus</i>	Scaly-throated honeyguide	Widespread	FF/F	UMBCP 2000
<i>Indicator meliphilus</i>	Eastern least honeyguide	Widespread	F/FF	Stuart and Jensen 1985 ²
<i>Indicator minor</i>	Lesser honeyguide	Widespread	F	UMBCP 2000
PICIDAE				
<i>Dendropicos fuscescens</i>	Cardinal woodpecker	Widespread	F	UMBCP 2000
<i>Dendropicos griseocephalus</i>	Olive woodpecker	Widespread	FF	UMBCP 2000
<i>Campethera abingoni</i>	Golden-tailed woodpecker	Widespread	O	Rodgers et al. 1983
EURYLAIMIDAE				
<i>Smithornis capensis</i>	African broadbill	Widespread	FF	UMBCP 2000
HIRUNDINIDAE				
<i>Hirundo senegalensis</i>	Mosque swallow	Widespread	O	UMBCP 2000
<i>Hirundo daurica</i>	Red-rumped swallow	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Hirundo fuligula</i>	African rock martin	Widespread	O	Svendsen and Hansen 1995
<i>Hirundo smithii</i>	Wire-tailed swallow	Widespread	O	Svendsen and Hansen 1995
<i>Hirundo rustica</i>	European (barn) swallow	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Psalidoprocne holomelas</i>	Black saw-wing	Widespread	O/F	UMBCP 2000
MOTACILLIDAE				
<i>Motacilla aguimp</i>	African pied wagtail	Widespread	O	UMBCP 2000
<i>Motacilla cinerea</i>	Grey wagtail	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Motacilla clara</i>	Mountain wagtail	Widespread	O	Svendsen and Hansen 1995
PYCNONOTIDAE				
<i>Andropadus virens</i>	Little greenbul	Widespread	FF/F	UMBCP 2000
<i>Andropadus masukuensis</i>	Shelley's greenbul	Widespread	FF	UMBCP 2000

² Stuart and Jensen 1985: mention a specimens “almost certainly of this species rather than the Kilimanjaro Honeyguide” collected by Th. Andersen in forest at 900 m.

Species	Common name	Range	Habitat	Most recent record
<i>Andropadus nigriceps</i>	Mountain greenbul	Widespread (but Uluguru endemic as <i>A. neumanii</i>)	FF	UMBCP 2000
<i>Andropadus olivaceiceps</i>	Olive-headed Greenbul	Widespread	FF/F	UMBCP 2000
<i>Phyllastrephus cerviniventris</i>	Grey-olive greenbul	Widespread	F	UMBCP 2000
<i>Phyllastrephus fischeri</i>	Fischer's greenbul	Eastern Arc & Coastal forests	FF	UMBCP 2000
<i>Phyllastrephus terrestris</i>	Terrestrial brownbul	Widespread	F	UMBCP 2000
<i>Phyllastrephus flavostriatus</i>	Yellow-streaked greenbul	Patchy distribution in eastern half of the continent incl. Albertine Rift	FF	UMBCP 2000
<i>Phyllastrephus debilis</i>	Tiny greenbul	Coastal Forest and lowlands of S Kenya, Tanz., C & S Moz.	FF/F	UMBCP 2000
<i>Phyllastrephus placidus</i>	Placid greenbul	Localised in highlands from Kenya, Tanz., N Moz. & Malawi	FF	Svendsen and Hansen 1995
<i>Chlorocichla flaviventris</i>	Yellow-bellied greenbul	Widespread	F/FF	Rodgers et al. 1983
<i>Pycnonotus barbatus</i>	Common bulbul	Widespread	O/F	UMBCP 2000
TIMALIIDAE				
<i>Turdoides jardineii</i>	Arrow-marked babbler	Widespread	O	Svendsen and Hansen 1995
<i>Pseudoalcippe abyssinica</i> ³	African hill babbler	Localised in eastern half of of the continent & a isolated population in C Angola	FF	UMBCP 2000
<i>Modulatrix stictigula</i>	Spot-throat	Eastern Arc & Mt Rungwe	FF	UMBCP 2000
<i>Illadopsis rufipennis</i>	Pale-breasted illadopsis	Widespread	FF	UMBCP 2000
TURDIDAE				
<i>Pogonocichla stellata</i>	White-starred robin	Widespread	FF/F	UMBCP 2000
<i>Sheppardia sharpei bangsi</i>	Sharpe's akalat	Usam., Ukaguru, Ulug., Udz., Nguus & Mt Rungwe. Uluguru endemic subspecies	FF	Svendsen and Hansen 1995
<i>Sheppardia aurantiithorax</i> ⁴	Rubeho akalat	Ulug., Ukaguru & Rubeho Mts	FF	UMBCP 2000
<i>Cossypha anomala</i>	Olive-flanked robin-chat	N Tanz. & C&S Eastern Arc, Southern highlands and S Malawi and N Moz.	FF	Svendsen and Hansen 1995
<i>Cossypha natalensis</i>	Red-capped robin-chat	Widespread	F/FF	UMBCP 2000
<i>Cossypha caffra</i>	Cape robin-chat	Widespread	O/F	Svendsen and Hansen 1995
<i>Cossypha heuglini</i>	White-browed robin-chat	Widespread	O/F	Svendsen and Hansen 1995
<i>Alethe fuelleborni</i>	White-chested alethe	Widespread	FF	UMBCP 2000
<i>Saxicola torquata</i> ⁵ (sic)	African stonechat	Widespread	O	Svendsen and Hansen 1995
<i>Saxicola rubetra</i>	Whinchat	Widespread palearctic migrant	O	Svendsen and Hansen 1995
<i>Neocossyphus rufus</i>	Red-tailed ant thrush	Cameroon to Congo River mouth, Albertine Rift and coastal Kenya & Tanz.	FF	UMBCP 2000
<i>Cercotrichas quadrivirgata</i>	Eastern bearded scrub robin	Widespread	O/F	Svendsen and Hansen 1995
<i>Zoothera gurneyi</i>	Orange ground thrush	Wide range but localised	FF	UMBCP 2000
<i>Turdus olivaceus</i>	Olive thrush	Widespread	FF	UMBCP 2000
MUSCICAPIDAE				

³ *Pseudoalcippe abyssinica* a number of genera are used for this species e.g. *Illadopsis* and *Alcippe*

⁴ Described by Beresford *et al.* 2004. (Beresford, P., Fjelds , J. and Kiure, J. 2004. A new species of akalat (*Sheppardia*) narrowly endemic in the eastern Arc of Tanzania. *Auk* 12(2): 23-34.

⁵ Following the latest taxonomy (Urquhart, E. 2002. Stonechats. A guide to the Genus *Saxicola*. Christopher Helm, London) this is the full species. Due to this taxonomy the European Stonechat takes the name *Saxicola rubicola*.

Species	Common name	Range	Habitat	Most recent record
<i>Muscicapa adusta</i>	African dusky flycatcher	Widespread	FF/F	Svendsen and Hansen 1995
<i>Muscicapa caerulescens</i>	Ashy flycatcher	Widespread	F/FF	UMBCP 2000
<i>Myioparus plumbeus</i>	Lead-coloured flycatcher	Widespread	O/F	Rodgers et al. 1983
SYLVIIDAE				
		Very localised in Eastern African highlands & S Sudan and Albertine Rift	F/FF	Svendsen and Hansen 1995
<i>Chloropeta similis</i>	Mountain yellow-warbler			
<i>Heliolais erythropetra</i>	Red-winged warbler	Widespread	O	UMBCP 2000
<i>Camaroptera brachyura</i>	Grey-backed camaroptera	Widespread	F/O	UMBCP 2000
<i>Phylloscopus winifredae</i>	Mrs Moreau's warbler	Widespread, however very uncommon in the Eastern Arc's montane forests. Uluguru	FF	UMBCP 2000
<i>Phylloscopus umbrovirens fugglescouchmani</i>	Brown woodland warbler	endemic subspecies Extreme S Kenya via Tanz, Malawi, E Zim. to S South Africa	FF	Svendsen and Hansen 1995
<i>Phylloscopus ruficapillus</i>	Yellow-throated woodland warbler		FF	Svendsen and Hansen 1995
<i>Bradypterus mariae</i>	Evergreen forest warbler	Widespread	FF	UMBCP 2000
		Localised in the highlands of Eastern half of the continent incl. Zimbabwe & Albertine Rift also		
<i>Bradypterus cinnamomeus</i>	Cinnamon bracken warbler	Cameroon Mts	FF	Svendsen and Hansen 1995
<i>Cisticola woosnami</i>	Trilling cisticola	Widespread	O	Svendsen and Hansen 1995
<i>Prinia subflava</i>	Tawny-flanked prinia	Widespread	O/F	Svendsen and Hansen 1995
<i>Melocichla mentalis</i>	African moustached warbler	Widespread	O/F	UMBCP 2000
<i>Apalis flavida</i>	Yellow-breasted apalis	Widespread	O	UMBCP 2000
		Mainly highlands from S Somalia, via Tanz. & Malawi to SC Moz.	FF	UMBCP 2000
<i>Apalis melanocephala</i>	Black-headed apalis			
		Very localised, Coastal S Kenya, Eastern Arc highlands & S Malawi	FF	Svendsen and Hansen 1995
<i>Apalis chariessa</i>	White-winged apalis			
		Widespread. Uluguru endemic subspecies	FF	UMBCP 2000
<i>Apalis thoracica uluguru</i>	(Uluguru) Bar-throated apalis			
		Highlands in Tanz. & Malawi	FF	Svendsen and Hansen 1995
<i>Apalis chapini</i>	Chapins apalis			
		Usam., Nguru, Ukaguru, Ulug., Udz., Matego Highlands & Njese Plateau. Uluguru endemic subspecies	FF	UMBCP 2000
<i>Orthotomus metopias altus</i>	African tailorbird			
		Extreme S Kenya, Coastal and lowland Tanz., & Netia N Moz.	FF	UMBCP 2000
<i>Macrosphenus kretschmeri</i>	Kretschmer's longbill			
ZOSTEROPIDAE				
<i>Zosterops senegalensis</i> ⁶	Yellow white-eye	Widespread	FF/F	UMBCP 2000
MONARCHIDAE				
		Mainly highlands from S Sudan, via Tanz. to C Malawi & Albertine Rift	F/O	Svendsen and Hansen 1995
<i>Dioptrornis fischeri</i>	White-eyed slaty flycatcher			
<i>Bias musicus</i>	Black-and-white flycatcher	Widespread	F/O/FF	Svendsen and Hansen 1995
		Northern Eastern Arc & Coastal forests of N Tanz. via Kenya to S Somalia	F/FF	UMBCP 2000
<i>Erythrocerus holochlorus</i>	Little yellow flycatcher			

⁶ *Zosterops senegalensis* is complex and might include several species, see e.g. BirdLife International Threatened Birds of the World.

Species	Common name	Range	Habitat	Most recent record
		Widespread in eastern half of the continent		
<i>Trochocercus albonotatus</i>	White-tailed crested flycatcher	incl. Albertine Rift	FF	UMBCP 2000
<i>Trochocercus cyanomelas</i>	Blue-mantled crested flycatcher	Widespread	F	UMBCP 2000
<i>Terpsiphone viridis</i>	African paradise flycatcher	Widespread	FF/F	UMBCP 2000
PLATYSTEIRIDAE				
<i>Batis mixta</i> ⁷ (<i>sensu lato</i>)	Forest batis	Eastern Arc & Coastal forests	FF	UMBCP 2000
<i>Platysteira peltata</i>	Black-throated wattle-eye	Widespread	F/O	UMBCP 2000
PRIONOPIDAE				
<i>Prionops retzii</i>	Retz's helmet shrike	Widespread	O/F	UMBCP 2000
<i>Prionops scopifrons</i>	Chestnut-fronted helmet shrike	Coastal & lowlands of Eastern Africa to S Moz.	F	UMBCP 2000
MALACONOTIDAE				
<i>Telophorus nigrifrons</i>	Black-fronted bush-shrike	Widespread	FF	UMBCP 2000
		Widespread in two large areas: Kenya-Tanz. and S Moz.-South Africa & Zimbabwe		
<i>Telophorus quadricolor</i>	Four-coloured bush-shrike		F	Rodgers et al. 1983
<i>Telophorus sulfureopectus</i>	Sulphur-breasted bush shrike	Widespread	F	Svendsen and Hansen 1995
		Uluguru endemic and very localised		
<i>Malaconotus alius</i>	Uluguru bush-shrike		FF	UMBCP 2000
<i>Laniarius aethiopicus</i>	Tropical boubou	Widespread	O/F	UMBCP 2000
		Eastern Arc and highlands of N Malawi		
<i>Laniarius fuelleborni</i>	Fulleborn's black boubou		FF	UMBCP 2000
<i>Dryoscopus cubla</i>	Black-backed puffback	Widespread	O/F	UMBCP 2000
		Widespread in mainly lower altitudes		
<i>Nicator gularis</i>	Eastern nicator		FF/F	Svendsen and Hansen 1995
<i>Tchagra senegala</i>	Black-headed tchagra	Widespread	O	Svendsen and Hansen 1995
CAMPEPHAGIDAE				
<i>Campephaga quisqualina</i>	Purple-throated cuckoo-shrike	Widespread	F	Svendsen and Hansen 1995
<i>Campephaga flava</i>	Black cuckoo-shrike	Widespread	O	Rodgers et al. 1983
		Highlands of eastern half of the continent and Cameroon Mts		
<i>Coracina caesia</i>	Grey cuckoo-shrike		FF	UMBCP 2000
DICRURIDAE				
<i>Dicrurus adsimilis</i>	Common drongo	Widespread	O/F	UMBCP 2000
<i>Dicrurus ludwigii</i>	Square-tailed drongo	Widespread	FF	UMBCP 2000
ORIOLIDAE				
<i>Oriolus larvatus</i>	Black-headed oriole	Widespread	O	UMBCP 2000
		Very localised and disjunct pop from S Kenya via Tanz. to S Malawi & C Moz.		
<i>Oriolus chlorocephalus</i>	Green-headed oriole		FF	UMBCP 2000
CORVIDAE				
<i>Corvus albus</i>	Pied crow	Widespread	O	UMBCP 2000
<i>Corvus albicollis</i>	White-naped raven	Widespread	O	UMBCP 2000
STURNIDAE				
		Kenya C highlands through E Arc to S Tanz.		
<i>Poeoptera kenricki</i>	Kenrick's starling		FF	Svendsen and Hansen 1995
		Eastern Africa, Albertine Rift & Cameroon Mts		
<i>Onychognathus walleri</i>	Waller's starling		FF	UMBCP 2000
<i>Onychognathus morio</i>	Red-winged starling	Widespread	O/F/FF	UMBCP 2000
		Widespread in coastal areas and adjoining		
<i>Lamprotornis corruscus</i>	Black-bellied (glossy) starling		O/F	Stuart and Jensen 1985

⁷ *Batis mixta* a revision is presently going on at the Zoological Museum of Copenhagen, which will change the species concept.

Species	Common name	Range	Habitat	Most recent record
		lowlands		
NECTARINIIDAE				
<i>Anthreptes neglectus</i>	Uluguru violet-backed sunbird	Eastern Arc & Coastal forests	FF	UMBCP 2000
<i>Anthreptes collaris</i>	Collared sunbird	Widespread	O/F	UMBCP 2000
<i>Anthreptes rubritorques</i>	Banded green sunbird	Udz., E. Usam., Ulug. and Nguru	FF	Not recently recorded
<i>Nectarinia olivacea</i>	Olive sunbird	Widespread	F/FF	UMBCP 2000
<i>Nectarinia loveridgei</i>	Loveridge's sunbird	Uluguru endemic	FF	UMBCP 2000
<i>Nectarinia venusta</i>	Variable Sunbird	Widespread	O/F	Svendsen and Hansen 1995
PLOCEIDAE				
<i>Ploceus bicolor</i>	Dark-backed weaver	Widespread	FF/F	UMBCP 2000
<i>Ploceus nicolli</i>	Tanzanian mountain weaver	Eastern Arc (but not Taita hills in Kenya) Tz endemic	FF	Not recently recorded
<i>Ploceus bertrandi</i>	Bertram's weaver	Localised in highlands of Tanzania N to Ulugurus & south to S Malawi	O	Svendsen and Hansen 1995
<i>Ploceus subaureus</i>	Golden weaver	Widespread in Eastern half of the continent	O	Svendsen and Hansen 1995
<i>Ploceus vitellinus</i>	Vitelline masked weaver	Widespread	O	Svendsen and Hansen 1995
ESTRILDIDAE				
<i>Lagonosticta rubricata</i>	African firefinch	Widespread	O	Svendsen and Hansen 1995
<i>Estrilda quartinia</i>	Yellow-bellied waxbill	Widespread	O	Svendsen and Hansen 1995
<i>Estrilda astrild</i>	Common waxbill	Widespread	O	Svendsen and Hansen 1995
<i>Lonchura cucullata</i>	Bronze mannikin	Widespread	O	Svendsen and Hansen 1995
<i>Lonchura nigriceps</i>	Rufous-backed mannikin	Widespread	O	Svendsen and Hansen 1995
<i>Mandingoa nitidula</i>	Green-backed twin-spot	Widespread	FF	UMBCP 2000
<i>Hypargos niveoguttatus</i>	Peter's twin-spot	Widespread	O/F/FF	UMBCP 2000
<i>Cryptospiza salvadorii</i>	Abyssinian crimsonwing	Very localised over a wide range from Eth., via S Somalia, Albertine Rift, Kenya highlands, N Tanz & Uluguru Mts	FF/F	Svendsen and Hansen 1995
<i>Cryptospiza reichenovii</i>	Red-faced crimsonwing	Localised in highlands of Tanz., Malawi, N Moz, E Zimbabwe, Albertine Rift, C Angola and Cameroon	FF	UMBCP 2000
<i>Pyrenestes minor</i>	Lesser seed-cracker	Localised in C&E Tanz., C&S Malawi, C Moz. & E Zimbabwe	F	Svendsen and Hansen 1995
<i>Emberiza cabanisi</i>	Cabanis's bunting	Widespread	O	Svendsen and Hansen 1995
FRINGILLIDAE				
<i>Serinus hypostictus</i>	African citril	Widespread	O/F	UMBCP 2000
<i>Linurgus olivaceus</i>	Oriole finch	Eastern Arc and few highlands, S Somalia, N Malawi, Albertine Rift & Cameroon	FF	Svendsen and Hansen 1995

Key to Table 6

The habitat preference of each species is described in the habitat column as:

FF = Species dependent on primary forest only. It does not include forest edge or secondary forest species;

F = Forest dwelling but not dependent on primary forest: species occurring in primary forest as defined above as well as other vegetation types. It should be emphasised that many of these species are still dependent on a forest habitat albeit forest edge or disturbed forest. Most species in this category will still be adversely affected by forest destruction.

O = These are species that do not normally occur in primary or secondary forest or forest edge.

4.3.3 Reptiles

Forty-six species of reptiles from 16 families have been recorded in the Ulugurus (Table 7). Thirty-two of these species were recorded during the UMBCP surveys and a further two species by Rodgers et al. (1983). The remaining 12 species have not been recorded recently.

Initial identifications were made using Broadley and Howell (1991) and confirmed identifications for the UMBCP specimens were been provided by Prof. K.M. Howell and Dr. D.G. Broadley. Specimens have been deposited at the University of Dar es Salaam and at the Natural History Museum of Zimbabwe.

Table 6. Checklist of reptiles of the Ulugurus.

Species	Common name	Range	Habitat	Most recent record
TESTUNDINIDAE				
<i>Kinixys belliana</i>	South-eastern hinge-back tortoise	Widespread	F	UMBCP 2000
GEKKONIDAE				
<i>Lygodactylus williamsi</i>	Turquoise dwarf gecko	Uluguru endemic	FF	UMBCP 2000
<i>Lygodactylus conradti</i>	Conradt's dwarf gecko	Tanzania endemic, Usam. & Ulu.	FF	Not recorded recently
<i>Lygodactylus l. luteopicturatus</i>	(Cape zebra false day gecko)	S Kenya & E Tanzania	??	UMBCP 2000
<i>Urocotyledon wolterstorffii</i>		Tanzania endemic, Usam. & Ulu.	FF	UMBCP 2000
<i>Cnemaspis africana</i>	Usambara forest gecko	Widespread	FF	UMBCP 2000
<i>Cnemaspis barbouri</i>	Uluguru forest gecko	Tanzania endemic, Usam. & Ulu.	FF	Not recorded recently
<i>Hemidactylus platycephalus</i>	Baobab gecko	Widespread	F	UMBCP 2000
AGAMIDAE				
<i>Agama ?montana</i>	Montane rock agama	Tanzania endemic, Usam. & Ulu.	F	UMBCP 2000
CHAMAELEONIDAE				
<i>Bradypodion fischeri uluguruensis</i>	Uluguru two-horned chameleon	Tanzania endemic, and sub-species endemic to Uluguru	FF	UMBCP 2000
<i>Bradypodion oxyrinum</i>	Uluguru one-horned chameleon	Tanzania endemic, Eastern Arc.	FF	UMBCP 2000
<i>Chamaeleo werneri</i>	Werner's three-horned chameleon	Tanzania endemic, Ulu. & Udz.	FF	UMBCP 2000
<i>Chamaeleo dilepis</i>	Common flap-necked chameleon	Widespread	F	UMBCP 2000
<i>Chamaeleo deremensis</i>	Usambara three-horned chameleon	Tanzania endemic, Usam. & Ulu.	FF	UMBCP 2000
<i>Rhampholeon brevicaudatus</i>	Bearded pigmy chameleon	Tanzania endemic; Coastal	FF	UMBCP 2000
<i>Rhampholeon uluguruensis</i>	Uluguru pigmy chameleon	Tanzania nand Eastern Arc Uluguru endemic	FF	UMBCP 2000
SCINCIDAE				
<i>Scelotes uluguruensis</i>	Uluguru fossorial skink	Tanzania endemic, Ulu. & Nguru	FF	Not recorded recently
<i>Melanoseps cf. ater</i>				UMBCP 2000
<i>Mabuya maculilabris</i>	Speckle-lipped skink	Widespread	F	UMBCP 2000
<i>Mabuya varia</i>	Variable skink	Widespread	F	UMBCP 2000
<i>Panaspis wahlbergii</i>	Savanna snake-eyed skink	Widespread	F	UMBCP 2000
LACERTIDAE				
<i>Holaspis guentheri laevis</i>	Eastern serrate-toad tree-lizard	Widespread	F	Rodgers et al. 1983
CORDYLIDAE				
<i>Gerrhosaurus major major</i>	Southern tawny plated-lizard	Widespread	F	UMBCP 2000
<i>Cordylus tropidosternum</i>	East African spiny-tailed lizard	Widespread	F	Rodgers et al. 1983
VARANIDAE				
<i>Varanus niloticus</i>	Nile monitor	Widespread	F	UMBCP 2000
TYPHLOPIDAE				

Species	Common name	Range	Habitat	Most recent record
<i>Typhlops gierrai</i>	Usambara blind-snake	Tanzania endemic, Ulu., Usam., Nguru & Ukag.	FF	Not recorded recently
<i>Typhlops uluguruensis</i>	Uluguru blind-snake	Uluguru endemic	FF	Gower 2004
<i>Typhlops sp. nov.</i>		Uluguru endemic		Broadley in lit.
LEPTOTYPHLOPIDAE				
<i>Leptotyphlops scutifrons</i>	Merker's worm-snake	Widespread	O	UMBCP 2000
BOIDAE				
<i>Python sebae</i>	Southern African python	Widespread	O	UMBCP 2000
VIPERIDAE				
<i>Bitis arietans</i>	Puff adder	Widespread	O	UMBCP 2000
<i>Atheris ceratophora</i>	Horned bush-viper	Tanzania endemic, Usam., Ulu. & Udz.	??	UMBCP 2000
ATRACTASPIDAE				
<i>Atractaspis aterrima</i>	Western forest stiletto-snake	Widespread in W Africa with "peculiar" isolated records in Tanz Eastern Arc.	F/FF	Not recorded recently
ELAPIDAE				
<i>Elapsoidea nigra</i>	Usambara garter-snake	Tanzania endemic, N Tanz., Usam. & Uluguru	FF	Not recorded recently
<i>Dendroaspis polylepis</i>	Black mamba	Widespread	O	UMBCP 2000
<i>Dendroaspis angusticeps</i>	Green mamba	Widespread in eastern half of the continent	F	UMBCP 2000
COLUBRIDAE				
<i>Lycophidion meleagre</i>	Speckled wolf-snake	S Kenya, N Tanz. & N coastal Angola	FF	Not recorded recently
<i>Aparallactus guentheri</i>	Black centipede-eater	Localised in eastern half of the continent S to E Zim and S Moz.	??	Not recorded recently
<i>Aparallactus wernerii</i>	Usambara centipede-eater	Tanzania endemic	FF	UMBCP 2000
<i>Buhome vauerocegae</i>	Usambara forest-snake	Tanzania endemic, Usam. & Ulu.	FF	UMBCP 2000
<i>Buhome procterae</i>	Uluguru forest-snake	Tanzania endemic, Ulu. & Udz.	FF	Not recorded recently
<i>Psammophis orientalis</i>	Eastern stripe-bellied sand snake	Widespread in eastern half of the continent	O	UMBCP 2000
<i>Prosymna ornatissima</i>	Ornate shovel-snout	Uluguru endemic	FF	Barbour and Loveridge 1926
<i>Philothamnus hoplogaster</i>	Southeastern green-snake	Widespread	F	UMBCP 2000
<i>Crotaphopeltis tornieri</i>	Tornier's cat snake	Tanz. Eastern Arc & coastal forest plateau, S. Highlands and N Malawi	FF	UMBCP 2000
<i>Crotaphopeltis hotamboeia</i>	Herald snake (Red-lipped snake)	Widespread	??	UMBCP 2000
CROCODYLIDAE				
<i>Crocodylus niloticus</i>	Nile crocodile	Widespread	O	UMBCP 2000

Key to Table 7

The habitat preference of each species is described in the habitat column as:

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O = These are species that do not normally occur in primary or secondary forest or forest edge.

4.3.4. Amphibians

44 species of amphibian from eight families have been recorded from the Uluguru Mountains (Table 10). A total of 39 species were recorded in 2000 by UMBCP, Prof. A. Channing or Dr. J. Mariaux. Two of the species which were not recorded in 2000 are endemic to the Uluguru.

Identifications have been provided by Prof. J.C. Poynton and Prof. K.M.Howell. Specimens are deposited at the British Museum for Natural History and at the University of Dar es Salaam.

Table 7. Checklist of amphibians of the Uluguru.

Species	Range	Habitat	Most recent record
ARTHROLEPTIDAE			
<i>Arthroleptis affinis</i>	Tanzania endemic, few coastal forests and Eastern Arc Mts	F/FF	UMBCP 2000
<i>Arthroleptis stenodactylus</i>	Widespread	F	UMBCP 2000
<i>Arthroleptis xenodactyloides</i>	N Tanz., through Malawi, N&C Moz to E Zimbabwe	F	UMBCP 2000
<i>Arthroleptis cf. xenochirus</i>	Zambia, Southern DRC, Angola		UMBCP 2000
<i>Arthroleptis ?xenodactylus</i>	Tanzania endemic, Eastern Arc	F	UMBCP 2000
BUFONIDAE			
<i>Bufo brauni</i>	Tanzania endemic, N Tanz. & Usam., Ulu., & Udz.	FF	UMBCP 2000
<i>Bufo gutturalis</i>	Widespread	O	UMBCP 2000
<i>Bufo maculatus</i>	Widespread	O	UMBCP 2000
<i>Nectophrynooides cryptus</i>	Uluguru endemic	FF	Howell 1993
<i>Nectophrynooides minutus</i>	Tanzania endemic, Ulu. & Rub.	FF	UMBCP 2000
<i>Nectophrynooides tornieri</i>	Tanzania endemic, Eastern Arc & Mt Rungwe	FF	UMBCP 2000
<i>Nectophrynooides viviparus</i>	Tanzania endemic, Ulu., Udz. & Mt Rungwe	F	UMBCP 2000
<i>Nectophrynooides sp. nov</i>	Uluguru endemic	FF	UMBCP 2000
HYPEROLIDAE			
<i>Hyperolius puncticulatus</i>	Localised from N. Tanz. through the Eastern Arc to S Malawi	F	UMBCP 2000
<i>Hyperolius spinigularis</i>	Localised from N. Tanz. through the Eastern Arc to S Malawi	F	Channing 2000
<i>Hyperolius tornieri</i> ¹	Uluguru endemic	FF/F	Not recorded recently
<i>Hyperolius mitchelli</i>	Widespread, N Tanz., via Malawi to C Moz	O	Mariaux 2000
<i>Hyperolius ?sp. nov.</i>			UMBCP 2000
<i>Afrixalus brachycnemis</i>	Widespread, coastal S Kenya, through Tanz., to S Malawi and SE Zambia	F	UMBCP 2000
<i>Afrixalus fornasini</i>	Widespread in eastern half of the continent and W Zimbabwe	O	UMBCP 2000
<i>Afrixalus uluguruensis</i>	Tanzania endemic, Few coastal forest and Eastern Arc Usam., Ulu., Nguru & Udz.	FF	?
<i>Leptopelis flavomaculatus</i>	Eastern half of the continent, S Kenya, through Tanz, N. Moz & Malawi to C Moz and E Zimbabwe	F/FF	UMBCP 2000
<i>Leptopelis parkeri</i>	Tanzania endemic, Eastern Arc Usam., Ulug., & Udz.	FF	UMBCP 2000
RHACOPHORIDAE			
<i>Chiromantis xerampelina</i>	Widespread	O	UMBCP 2000
MICROHYLIDAE			
<i>Callulina kreffti</i>	Eastern Arc endemic (incl. Taita)	FF	UMBCP 2000
<i>Probreviceps macrodactylus</i>	Eastern Arc endemic & Mt Rungwe	FF	UMBCP 2000
<i>Probreviceps uluguruensis</i>	Uluguru endemic	FF	UMBCP 2000
<i>Spelaeophryne methneri</i>	Tanzania endemic, Ulu., Udz., Mahenge, Magento Highlands, & Rondo Coastal Forest	F	UMBCP 2000
<i>Mertensophryne micranotis</i>	Kenya and Tanzania endemic coastal forests and Eastern Arc	FF	UMBCP 2000

Species	Range	Habitat	Most recent record
<i>Hoplophryne uluguruensis</i>	Tanzania Endemic, Ulu. & Nguru	FF	Not recorded recently
PIPIDAE			
<i>Xenopus muelleri</i>	Widespread	F	UMBCP 2000
RANIDAE			
<i>Arthroleptides martiensseni</i>	Tanzania endemic, Usambara, Uluguru and Udzungwa	FF	UMBCP 2000
<i>Arthroleptides yakusini</i>	Tanzania endemic, Uluguru, Mahenge and Udzungwa	F	UMBCP 2000
<i>Phrynobatrachus natalensis</i>	Widespread	F	UMBCP 2000
	Eastern half of the continent, S Somalia, S Kenya, through Tanz., Malawi, and throughout Moz. To NE		
<i>Phrynobatrachus acridoides</i>	S. Africa	F	UMBCP 2000
<i>Phrynobatrachus sp. A</i>			UMBCP 2000
<i>Phrynobatrachus sp. B</i>			UMBCP 2000
	Very localised in coastal S Kenya, coastal forests and highlands of		
<i>Phrynobatrachus ?ukingensis</i>	Tanz. & S Malawi	F/FF	UMBCP 2000
<i>Ptychadena anchietae</i>	Widespread	??	UMBCP 2000
<i>Afrana angolensis</i>	Widespread	O	UMBCP 2000
	Eastern half of the continent, N Tanz., Zimbabwe and NE& S South Africa		
<i>Strongylopus fasciatus fuelleborni</i>			UMBCP 2000
CAECILIIDAE			
<i>Boulengerula uluguruensis</i>	Tanzania endemic, Uluguru & Nguru	FF	UMBCP 2000
<i>Scolecormorphus uluguruensis</i>	Uluguru endemic	FF	UMBCP 2000
<i>Scolecormorphus vittatus</i>	Tanzania endemic, Eastern Arc	FF	?

¹The validity of this species has been questioned.

Key to Table 8

The habitat preference of each species is described in the habitat column as:

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O = Species that do not normally occur in primary or secondary forest or forest edge.

4.3.5 Millipedes

Specimens have been deposited at the Zoological Museum of the University of Copenhagen. An initial description of the collection has been provided by Prof. Henrik Enghoff.

Many of the millipedes have not yet been identified and so it is not possible to present a species list, however preliminary examination shows that the collection includes many undescribed species even among the larger specimens. Among the interesting species are:

- *Pachylobus morogoroensis* Kraus, 1958. This very large, sausage-like species belongs to a species group that is currently being revised. Formerly it was known only from the type specimen.
- *Dendrostreptus* n.sp. A single male belongs to a new species of this hitherto monotypic genus which is very unusual within its family because it lives in trees. The new species is large (>10 cm) with very long legs.
- There are also specimens of the well-known *D. macracanthus* (Attems, 1914) in the material. This species is best known from the Usambara Mountains and may represent a range extension.

- A new genus of Oxydesmidae (a family of flatbacked millipedes). This is remarkable as the family was revised as late as in 1990.

4.4 Notable records

4.4.1 Plants

The surveys recorded a number of plant species which are not listed as being present in the Flora of Tropical East Africa region for the Ulugurus (T6).

Species not listed as being present in T6 by LEAP (List of East African Plants) and for which no FTEA volume was available include *Asparagus asperigoides*, *Ageratum conyzoides*, *Emilia caespitosa*, *Helichrysum odoratissimum*, *Helichrysum traversii*, *Mikania chenopodifolia*, *Begonia oxyloba*, *Scleria racemosa*, *Pavonia urens*, *Platylepis glandulosa* and *Dombeya acutangula*.

Species or infra-species whose ranges are described by the FTEA as not including T6 include *Meineckia fruticans* var. *engleri*, *Rhynchosia congensis* subsp. *pseudobuettneri*, *Rhynchosia malacophylla*, *Strychnos usambarensis*, *Rothmannia whitfieldii* and *Triumfetta cordifolia*.

Species recorded during the surveys with ranges restricted to T6 according to LEAP include *Chlamydstachya spectabilis* and *Stendandrium afromontanum*.

Species, sub-species or varieties recorded during the surveys with ranges restricted to T6 according to the FTEA include *Coffea* sp. E of FTEA, *Ophrypetalum odoratum* subsp. *longipedicellatum*, *Gravesia pulchra* var. *glandulosa*, *Lasianthus cereiflorus*, *Pavetta crebrifolia* var. *kimbozensis*, *Turraea kimbozensis*, *Ixora tanzaniensis* and *Tricalysia pedicellata*.

4.4.2 Mammals

For the first time, the bat *Myonycteris relicta* and the rodent *Beamys hindei* were recorded in the Ulugurus.

One of the initial reasons for conducting the surveys was to investigate a report by a local forester that there were red colobus “mbega nyekundu” in Mvuha / Chamanyani Forest Reserve (Lovett, 1993). No red colobus were observed however the blue monkeys in this area have a very red pelage similar in colour to the red caps of an Iringa red colobus. The red on their backs extends from just below the shoulders to the base of the tail and is present on males and females from infancy. The pelage on these monkeys differs significantly from that of Usambara blue monkeys where red is usually only found on adult males and is not as bright as on the lowland Uluguru animals. In the Udzungwas the reddish pelage has also been recorded but is a duller red (Perkin pers comm.). The lowland Uluguru population resemble *Cercopithecus mitis moloneyi* and they may represent a northern outlier of this subspecies. Populations of *C. mitis* at higher altitude have the more typical grey pelage. This reflects the complex biogeography of the *C. mitis* complex.

A genet with unusual markings was observed in Uluguru South between Tchenzema and the Lukwangule Plateau. The animal had the distinctive tail bands of a common genet but the markings on its back were more similar to those of a blotched genet. Although similar in appearance to a servaline genet it was observed in a tree, 5 m above the ground, which is not typical behaviour for them. In Tanzania, the servaline genet has only been recorded in Udzungwa Mountains where there is the endemic subspecies *Genetta servalina lowei* described on the basis of a single incomplete specimen (Kingdon 1997).

The Eastern Arc / Coastal forest endemic galagos, *Galagoides orinus* and *Galagoides zanzibaricus* were recorded within 50 m of each other at 550 m altitude in Mkungwe Forest

Reserve. This is the first time that they have been recorded in such close proximity (Perkin 2000) and this is the lowest record for *G. orinus*.

Although only one hyrax species has been listed the calls varied markedly suggesting that more than one species is present, probably *Dendrohyrax validus* and *Heterohyrax brucei*. Recordings were made of their calls and are held by the Nocturnal Primates Research Unit at Oxford Brookes University (UK).

4.4.3 Birds

The akalat caught in Milawilila is also found in the Rubeho and Ukaguru Mountains and is being described as a new species (*Sheppardia aurantithorax*). This species is much more abundant in the Ukaguru and Rubeho (Beresford *et al.* 2004).

The Eastern Arc endemic Tanzanian mountain weaver (*Ploceus nicolli*) was not recorded by the UMBCP study or by Svendsen and Hansen (1995) suggesting that it may have been extirpated in the Ulugurus. However, particular effort is needed to record this species as it is only encountered in mixed feeding flocks and then in low numbers.

The Uluguru endemic species Uluguru bush-shrike (*Malaconotus alius*) was not recorded in Mkungwe Forest Reserve, although this reserve contains natural forest at its preferred altitude and Mkungwe is only a few kilometres from populations in Uluguru North Forest Reserve. This reinforces the importance of Uluguru North for the conservation of this species.

4.4.4 Reptiles

For the first time *Chamaeleo deremensis* was recorded in the Uluguru Mountains, this species was previously thought to be restricted to the Usambara and Nguru Mountains.

The range of the endemic chameleon *Rhampholeon uluguruensis* was extended to include Mkungwe Forest Reserve. Previously it was known only from Uluguru North Forest Reserve. Specimens of *R. uluguruensis* were found in pristine submontane forest whereas *R. brevicaudatus* was abundant in the more disturbed and drier parts of Mkungwe.

The capture of a specimen of *Atheris ceratophorus* confirms its presence in the Ulugurus, which has been under debate.

4.4.5 Amphibians

Probreviceps macrodactylus and *P. uluguruensis* were caught within five metres of each other. *Probreviceps macrodactylus* typically has golden irises and all specimens caught below 2000 m asl had golden irises. One *P. uluguruensis* with red irises was caught at 2550 m asl. Animals in the intermediary zone at 2100 m – 2200 m asl varied, some having red and some having gold irises. Both ‘species’ spend much of the day in tunnels in areas with a rich humus layer.

The Eastern Arc endemic, *Nectophrynoides viviparus* appears to be the most common amphibian between 2000 m and 2400 m asl. Many animals were heard calling during the day and night. The toads are strong crawlers and often wedge themselves in narrow cracks in rock faces.

In Kasanga Forest Reserve a group of at least six *Arthroleptides martiensseni* were found around a small waterfall. A large individual was sitting beside the main flow of water and was calling loudly. Other animals in the surrounding rocks were also calling. A sheet of eggs had been laid on the moist rocks at the top of the waterfall. A recording of their call has been deposited at the Oxford Brookes Nocturnal Primates Research Group (UK). The species *Arthroleptides*

martiensseni is being reviewed due to morphological differences between populations along the E. Arc. The Uluguru animals have recently been named as a new species *Arthroleptides yakusini*, which also occurs in the Udzungwas (Channing *et al.* 2002).

5) Discussion

The forests of the Uluguru Mountains have high levels of species richness and endemism. There is significant variation between the reserves in both species richness and the number of endemic species. The large high altitude reserves of Uluguru North and South have the greatest number of species, including numerous endemic species. Outside of the reserves, most of the forest has been cleared for agriculture and species richness and levels of endemism are low.

Table 8. Summary of the biodiversity of the Ulugurus

Taxon	Species richness	Endemics	Near endemics	No. species not recorded in the last 10 years
Plants	N/a	135	N/a	N/a
Mammals	76	3	10	30
Birds	140	2	10	2
Reptiles	47	5	16	12
Amphibians	44	6	18	2
Total	307	16	54	46

5.1 Species richness

Although the surveys recorded 381 plant species this is only a fraction of the total species richness of the area. Other botanical surveys in the area have recorded many species not mentioned in Appendix I (Rodgers *et al.* 1983, J. Lovett, T. Pócs, Q. Luke unpublished data, FTEA). Even within the UMBCP collection there remain 94 specimens that have not yet been identified. A more comprehensive assessment of the flora of the Ulugurus will require more intensive surveys and a compilation of data from previous surveys. Some of the necessary compilation is provided in the partially complete plant species lists compiled by T. Pócs for the UMBCP (see www.africanconservation.com/uluguru). Similarly it is not possible to make comparisons between the species richness of the individual reserves as the species lists presented in Section 8 are strongly determined by sampling intensity.

In terms of the fauna, there are more than 300 vertebrate species living in the Uluguru Mountains and their foothills (Table 9). Of these, birds are the most diverse order with 140 species and amphibians the least diverse with 39 species.

The two largest Forest Reserves, Uluguru North and Uluguru South have the highest species richness (Table 10). However even some of the lowland reserves have high species richness for example Kimboza and Mkungwe both have over 100 vertebrates species. Although Shikurufumi appears to have the lowest diversity this is largely because birds were not surveyed in this reserve.

Table 9. Summary of the vertebrate species richness of 13 Uluguru Forest Reserves.

Forest Reserve	Number of species				
	Mammals	Birds	Reptiles	Amphibians	Total
Uluguru total	76	140	47	44	307
Bunduki	2	44	8	4	58
Kasanga	10	17	4	8	39
Kimboza	16	82	10	6	114
Konga	7	22	4	2	35
Mangala	6	54	3	2	65
Mkungwe	15	62	13	15	105

Milawilila	2	49	2	3	56
Mvuha / Chamanyani	11	60	6	9	86
Ngambaula	4	39	2	4	49
Ruvu	13	58	13	8	92
Shikurufumi	8	n/a	3	4	15
Uluguru North	59	60	3	19	141
Uluguru South	59	58	3	9	129

5.2 Endemism

The Ulugurus contain at least 135 endemic plant taxa plus hundreds of species shared only with other Eastern Arc Mountains (Burgess et al. 2002). Many of the endemic species are poorly known and some have not yet been fully described. Only five of the endemic plant taxa were recorded during the surveys: *Coffea* sp. E of FTEA, *Ophrypetalum odoratum* subsp. *longipedicellatum*, *Lasianthus cereiflorus*, *Pavetta crebrifolia* var. *kimbozensis* and *Turraea kimbozensis*.

The Ulugurus have 16 endemic and 54 near-endemic vertebrates. Amphibians have the highest number of endemic and near-endemic species (24) and birds the lowest (12).

Most endemic vertebrates are restricted to one or two reserves (Table 11). Two species are only found in unreserved land around the Kitundu Hills and the gecko *Lygodactylus williamsi* is found only in the lowland reserves of Kimboza and Ruvu.

Table 10. Geographical ranges of species endemic to the Ulugurus.

Taxon	Reserves from which recorded	Altitudinal range (metres above sea level)	Most recent record
Mammals			
<i>Crocidura telfordi</i>	Uluguru North and / or South	> 1500	Stanley et al. 1998
<i>Myosorex geata</i>	Uluguru North and / or South and Shikurufumi	> 1500	Swynnerton and Hayman 1950
<i>Chrysochloris stuhlmanni tropicalis</i>	Uluguru North and / or South	> 1500	Swynnerton and Hayman 1950
Birds			
<i>Malaconotus alius</i>	Uluguru North	1320 – 1710	UMBCP 2000
<i>Nectarinia loveridgei</i>	Uluguru North and South	1200 – 2580	UMBCP 2000
Reptiles			
<i>Lygodactylus williamsi</i>	Kimboza, Ruvu	300 – 400	UMBCP 2000
<i>Rhampholeon uluguruensis</i>	Uluguru North, Mkungwe	900 – 1500 750	UMBCP 2000 Recorded in 2004 (after these surveys were completed)
<i>Typhlops uluguruensis</i>	Unreserved land at Kitundu Hills		
<i>Typhlops</i> sp. nov.			
<i>Prosymna ornatissima</i>	Unreserved land at Kitundu Hills	700 – 1000	Not recorded recently
Amphibians			
<i>Nectophrynoides cryptus</i>	Bondwa Hills, Uluguru North and South	> 900	Howell 1993
<i>Nectophrynoides minutus</i>	Uluguru North and Mkungwe	> 1000	UMBCP 2000
<i>Nectophrynoides</i> sp. nov.	Uluguru North	>1500	UMBCP 2000
<i>Hyperolius tornieri</i>	Unknown	> 1500	Not recorded recently
<i>Probreviceps uluguruensis</i>	Uluguru South	> 1500	UMBCP 2000
<i>Scolecophorus uluguruensis</i>	Uluguru North	> 1500	UMBCP 2000

The near-endemic species are found in a greater number of reserves than the endemics (Table 12). Although 15 near-endemic species are found in only a single reserve, many are found in more than two reserves including *Otolemur garnetti* which is found in seven reserves.

Table 11. Distribution of near-endemic species in 13 Uluguru Forest Reserves.

Species	Forest Reserve												
	Bu	Ka	Ki	Ko	Ma	Mi	Mk	Mv	Ng	Ru	Sh	Un	Us
Mammals													
<i>Otolemur garnettii</i>	x		x		x		x	x		x	x		
<i>Galagoides zanzibarcus</i>			x		x		x	x		x	x		
<i>Galagoides orinus</i>							x					x	x
<i>Myonycteris relict</i>							x						
<i>Kerivoula africana</i>												x	x
<i>Crocidura monax</i>												x	x
<i>Sylvisorex howelli</i>												x	x
<i>Rhynchocyon petersi</i>		x										x	x
<i>Beamys hindei</i>		x											
<i>Cephalophus spadix</i>												x	x
Birds													
<i>Bubo vosseleri</i>							x					x	
<i>Phyllastrephus fischeri</i>					x	x	x	x		x			
<i>Modulatrix stictigula</i>												x	x
<i>Sheppardia sharpei</i>												x	x
<i>Sheppardia aurantithorax</i>					x	x							
<i>Phylloscopus winifredae</i>	x											x	x
<i>Orthotomus metopias</i>	x											x	x
<i>Erythrocerus holochlorus</i>										x			
<i>Anthreptes rubritorques</i>													
<i>Ploceus nicolli</i>													
Reptiles													
<i>Urocotyledon wolterstorffii</i>	x						x						
<i>Cnemaspis barbouri</i>													
<i>Agama montana</i>			x		x								
<i>Bradypodion fischeri uluguruensis</i>	x												x
<i>Bradypodion oxyrhinum</i>	x						x						x
<i>Chamaeleo werneri</i>	x												x
<i>Chamaeleo deremensis</i>							x						
<i>Rhampholeon brevicaudatus</i>	x		x		x	x	x		x	x	x		
<i>Scelotes uluguruensis</i>													
<i>Typhlops gierrai</i>													
<i>Atheris ceratophorus</i>												x	
<i>Elapsoidea nigra</i>													
<i>Aparallactus werneri</i>					x		x						
<i>Buroma vauerocegae</i>							x						
<i>Buroma procterae</i>													
<i>Crotaphopeltis tornieri</i>	x	x									x	x	
Amphibians													
<i>Arthroleptis reichei</i>													
<i>Arthroleptis xenodactylus</i>												x	
<i>Bufo brauni</i>		x											
<i>Nectophrynoides tornieri</i>			x				x						
<i>Nectophrynoides viviparus</i>												x	x
<i>Hyperolius spinigularis</i>												x	
<i>Africalus uluguruensis</i>													
<i>Leptopelis parkeri</i>			x				x					x	x
<i>Leptopelis uluguruensis</i>													

<i>Callulina kreffii</i>	x		x		x		
<i>Probreviceps macrodactylus</i>			x				x x
<i>Spelaeophryne methneri</i>				x			
<i>Mertensophryne micranotis</i>					x		
<i>Hoplophryne uluguruensis</i>							
<i>Arthroleptides martiensseni</i>	x		x				x
<i>Phrynobatrachus uzungwensis</i>							x
<i>Boulengerula uluguruensis</i>			x				

Key to Table 12			
x:	species present.		
Bu:	Bunduki	Mv:	Mvuha
Ka:	Kasanga	Ng:	Ngambaula
Ki:	Kimboza	Ru:	Ruvu
Ko:	Konga	Sh:	Shikurufumi
Ma:	Mangala	Un:	Uluguru North
Mi:	Milawilila	Us:	Uluguru South
Mk:	Mkungwe		

The two main forest blocks, Uluguru North and South Forest Reserves have the highest number of endemic species (Table 13) although some published mammal records do not differentiate between Uluguru North and South. A similar pattern emerges with the distribution of near-endemic species although in this case, Mkungwe Forest Reserve with its mix of lowland and submontane forest has as many as Uluguru North (Table 14).

Table 12. Number of endemic vertebrates recorded in 13 Uluguru Forest Reserves

Forest Reserve	Number of endemic vertebrates				
	Mammals	Birds	Reptiles	Amphibians	Total
Bunduki	0	0	1	0	1
Kasanga	0	0	0	0	0
Kimboza	0	0	1	0	1
Konga	0	0	0	0	0
Mangala	0	0	0	0	0
Milawilila	0	0	0	0	0
Mkungwe	0	0	1	0	1
Mvuha / Chamanyani	0	0	0	0	0
Ngambaula	0	0	0	0	0
Ruvu	0	0	1	0	1
Shikurufumi	1	0	0	0	1
Uluguru North	3*	2	1	4	10
Uluguru South	3*	1	1	2	7

*This assumes that the mammals *Myosorex geata*, *Crocidura telfordi* and *Chrysochloris stuhlmanni tropicalis* are found in both Uluguru North and South although published data states high altitude 'Uluguru' only.

Table 13. Number of near-endemic vertebrates recorded in 13 Uluguru Forest Reserves.

	Mammals	Birds	Reptiles	Amphibians	Total
Bunduki	1	2	6	1	10
Kasanga	2	0	1	2	5
Kimboza	2	1	2	2	7
Konga	0	0	0	0	0
Mangala	2	2	3	0	7
Milawilila	0	2	1	0	3
Mkungwe	4	2	6	6	17
Mvuha / Chamanyani	2	1	0	0	3

Ngambaula	0	0	0	1	1
Ruvu	2	2	1	1	6
Shikurufumi	2	n/a	2	1	5
Uluguru North	6	5	3	7	17
Uluguru South	6	4	3	4	13

*This assumes that all mammals recorded by Stanley et al. (1998) and by Swynnerton and Hayman (1950) are found in both Uluguru North and South although published data states high altitude 'Uluguru' only.

5.3 Biogeography

The fauna of the Ulugurus is very rich and typical of the forests of the Eastern Arc. There are also overlaps with the coastal forest fauna in the Uluguru lowlands and with the fauna of the Southern Highlands / Northern Malawi. In relation to other Eastern Arc ranges the Uluguru Mountains have a greater affinity with the Usambara Mountains than with other Eastern Arc ranges. Of the 54 near-endemic species recorded in the Ulugurus, 45 are also found in the Usambara Mountains compared with only 34 species that are also found in the Udzungwa Mountains. Furthermore of those species restricted to the Ulugurus and one other area (coastal forest or another Eastern Arc mountain range), the Ulugurus again shows the greatest affinity to the Usambaras (Table 15). Although the Udzungwa Mountains are closer to the Ulugurus, the Usambaras are more similar to the Ulugurus in terms of rainfall and proximity to the coastal forests.

Table 14. Distribution of near-endemic vertebrates found in the Ulugurus and only one other locality.

Mountain range	Number of species shared exclusively with Ulugurus
Coastal forest	1
Ngurus	2
Udzungwa	3
Usambara	11

5.4 Altitudinal associations

A comparative analysis of the altitudinal distribution of species cannot yet be attempted due to insufficient data. However initial findings suggest that each 500 m altitudinal band of forest has at least one endemic vertebrate species that is confined to that area (from the lowland Kimboza forests at 300 m altitude through to the upper montane forests at more than 2000 m in Uluguru North and 2400 m in Uluguru South). Further study is very likely to find even more stratification altitudinally in the endemism patterns, especially among invertebrates and plants. In other Eastern Arc forests altitudinal stratification of endemic invertebrate assemblages have been found (University of Copenhagen unpublished spider data). A similar pattern may also be found in the Uluguru Mountains.

5.5 Resource use

This report approaches the issue of resource use by looking at its impact on biodiversity. Hymas (2000) provides a full description of resource use from a sociological perspective. In addition, while this report focuses on the situation within Forest Reserves, Hymas discusses the situation outside of the reserves where other pressures such as banana cultivation are a key threat.

Table 15. Summary of resource use in 13 Uluguru Forest Reserves.

	Agricultural clearance	Fire	Logging	Mining	Plantation	Wildlife trade	Invasive species	Cattle grazing
Bunduki			x		x	x		
Kasanga		x	x		x			
Kimboza			x				x	
Konga	x	x						
Mangala	x	x	x			x		

Milawilila		x	x			
Mkungwe		x	x			
Mvuha / Chamanyani		x	x	x		x
Ngambaula	x	x	x		x	
Ruvu	x	x	x	x	x	
Shikurufumi		x			x	
Uluguru North		x	x			
Uluguru South			x		x	

Historically the main threat to the forest has been the expansion of agriculture and the economic and demographic pressures that have driven that expansion. Today, most of the Uluguru forests have already been cleared for agriculture. Remaining forest is almost exclusively on reserved land gazetted as either national or local authority Forest Reserves. Small forest patches also remain on village land and two village Forest Reserves are being established just north of Uluguru North Forest Reserve.

Despite legal restrictions, resource use continues in all reserves. Some activities such as pole cutting and hunting occur in all reserves, while other activities such as mining and cattle grazing are specific to a few reserves. Table 16 summarises the activities recorded in the 13 Forest Reserves visited during this survey and by Hymas (2000).

5.5.1 Pole cutting

This occurs in all reserves. Pole cutting can be conducted sustainably provided that harvesting does not focus too intensively on a single area or species. Pole cutting becomes problematic where it is too intensive and where it opens up the forest edge to other disturbance particularly fire. This overexploitation was occurring in the west of Mkungwe and at the edge of all of the local authority Forest Reserves.

5.5.2 Hunting

Many mammal, bird and reptile species are being hunted in the forests of the Ulugurus and hunting occurs in all Forest Reserves. People hunt either for subsistence or for trade. Broadly hunting can be categorised as being for:

- a) bush meat
- b) skins/hides
- c) live collections

a) Bushmeat

Local people are trapping mammals from all Forest Reserves. The animals most commonly reported as being trapped are *Cephalophus harveyi* (Harvey's red duiker) and *Cephalophus monticola* (blue duiker).

In non-Muslim areas, particularly along the Ruvu, people are trapping *Potamochoerus larvatus* (bush pig) and *Dendrohyrax* sp. (tree hyrax).

There is trapping for birds throughout the mountains although this usually occurs in farmland and woodland outside of the forest.

Around Tchenzema hunters trap *Cercopithecus mitis* (blue monkey) for meat. They also hunt the vulnerable *Cephalophus spadix* (Abbot's duiker), the skins of which are then used to make drums in Ng'ungulu (village south of Tchenzema). Abbot's duiker is reputed to be aggressive when cornered and animals have injured hunters with their horns.

Hunting for bush meat is for local consumption and subsistence. Nobody mentioned sale of the meat to urban areas, indeed there is demand in the villages of the Ulugurus for bush meat from the Selous. In Kasanga Forest Reserve we met a trader carrying giraffe meat from the Selous for sale in the village. Buffalo and hippo meat are also popular and wildebeest tails are sold for local customs.

Most animals are trapped using various kinds of snares. Pits were also being used in Ruvu and Bunduki. Fire is used to smoke the hyrax from their trees and near Tchenzema we met two hunters with three dogs that they used to scare blue monkeys from the trees. Birds are generally killed using catapults.

b) Skins

There is a trade in the pelts of *Panthera pardus* (leopard), *Colobus angolensis* (Angola pied colobus) and *Cercopithecus mitis* (blue monkey).

An elder in Mkuyuni, known as Bwana Chui, hunts leopard from Ruvu Forest Reserve. The skins are sent to European traders in Arusha.

Angola pied colobus and blue monkey furs from Ngambaula and Mangala Forest Reserves are supplied by hunters from Ludewa. Trade was at its peak in the 1980s when a European trader trained local people to preserve and prepare the skins for sale. Demand for the primate furs is reported to be from Europeans in Arusha.

Animals are hunted using shot guns and locally made guns, gobole. Gobole are manufactured near Shikurufumi and in Morogoro town.

c) Live collections

Live birds, chameleons and tortoises are being collected for the zoo and pet trade.

Birds traded include red-faced crimsonwing, yellow-fronted serin, Peter's twinspace, African citril, oriole finch, brown snake eagle and Livingstone's turaco. With the exception of the brown snake eagle and the yellow-fronted serin these birds are collected from Forest Reserves. The birds are sent to traders in Dar es Salaam.

Birds are trapped using dyed fish nets bought in Dar es Salaam. Formerly mist nets were being provided by a trader in Dar however this supply has apparently been finished.

Chameleons being traded include *Chamaeleo werneri*, *Bradypodion oxyrinum* and *Chamaeleo fischeri uluguruensis*. Adults and children collect these animals. In the village the *B. oxyrinum* and *C. f. uluguruensis* are sold for TSh 150, and *C. werneri* costs TSh 200.

As with the birds, chameleons are being sold in Dar es Salaam.

5.5.3 Fire

Fire is one of the greatest threats to the forests of the Eastern Arc. Fire both destroys and degrades forest. Whereas woodlands are usually tolerant of fires, most forest species are not. Intrusion of fire opens up the forest to widespread woodland species thereby reducing its biodiversity value both in terms of species richness and uniqueness / endemism. Fire usually spreads from agricultural land or woodland and is most prevalent in the lowlands. Fires are of particular concern in Mkungwe, the local authority Forest Reserves and the lowland reserves of

Ruvu and Mvuha / Chamanyani. In all of these reserves there were clear signs that fire was damaging the forest habitat.

5.5.4 Logging

Illegal logging is occurring primarily in the lowland Forest Reserves. Target species include *Khaya anthotheca*, *Albizia gummifera* and *Milicia excelsa*. Logging both depletes the population of the target species and changes the structure of the forest. When timber trees are removed the forest canopy is opened up thereby enabling more widespread species to regenerate and making the forest more vulnerable to fire.

In the case of Mkungwe villagers were employed to cut the wood by a village elder. Pitsaw camps were found throughout the forest. Although there is a forest guard stationed in Kikundi he was unable or unwilling to tackle the problem. A similar pattern was noted in other Forest Reserves including Mvuha. Hymas (2000) describes in more detail the socio-economic background to logging in the Ulugurus.

5.5.5 Mining

Mining is occurring in Mvuha and Ruvu Forest Reserves. The miners collect rubies, gold and rhodolite. The most intense impact is along the banks of the rivers where the miners excavate the river banks and establish camps.

5.5.6 Invasive species

In Kimboza Forest Reserve, *Cedrela* sp. from neighbouring plantations has invaded the forest replacing indigenous trees. There is also some *Maesopsis* in Uluguru North.

5.5.7 Cattle

Cattle grazing was most obvious in Mvuha / Chamanyani. Maasai pass through the reserve with herds of cattle. The impact is largely restricted to the woodlands and around watering holes and at the current level does not appear to be a significant threat to biodiversity.

5.6 Critical areas

The minimum area required to protect all of the Uluguru endemic vertebrate species would need to include Uluguru North Forest Reserve, unreserved land around Kitundu Hills, Uluguru South Forest Reserve and Kimboza Forest Reserve (Table 17).

Table 16. Minimum area required to protect all Uluguru endemic species.

Forest Reserve	Cumulative endemic species protected
Uluguru North	10
Unreserved land around Kitundu Hills	2
Uluguru South	1
Kimboza	1

The minimum area required to protect all of the near-endemic species recorded in the Ulugurus would need to include Uluguru North and South, Mkungwe, Bunduki, Kasanga, Ruvu, Kimboza and Milawilila Forest Reserves.

5.7 Critical species

Species at greatest risk are those with a restricted range, narrow habitat preferences and a range exclusively in land outside of the Forest Reserves.

Of greatest concern are the two snakes *Prosymna ornatissima* and *Typhlops uluguruensis*. Both species are endemic to the Ulugurus and have only been recorded from forest edge at mid-altitude on the Kitundu/Kitumbaku Hills. Their known range is rapidly being turned into banana plantation.

Other species of concern include the Uluguru bush shrike *Malaconotus alius* and the Uluguru dwarf chameleon *Rhampholeon uluguruensis*. Although both species have been found in Uluguru North, they have only been recorded below 1700 m asl. Much of their range has already been cleared for agriculture and some, on the Kitundu/Kitumbaku Hills is being converted to banana plantation.

Some species are of concern because they are under species-specific pressure. This includes the Abbott's duiker, which is threatened by hunting and habitat loss across its whole range. It is listed as vulnerable by IUCN.

6. Management recommendations

1. Uluguru North and South Forest Reserves should remain the focus for conservation activities given their national importance for water catchment and global importance for biodiversity.
2. Additional support should be given to the conservation of those other Forest Reserves that are required to conserve the full complement of Uluguru endemic and near-endemic species - such as Mkungwe, Kimboza and Bunduki.
3. The loss of forest cover between Uluguru North and South Forest Reserves since the 1955 aerial photographs may have had serious implications for larger mammals and strictly forest dependent birds. Efforts should be made to re-forest the area around Bunduki and thereby restore the corridor between these two Forest Reserves. Currently the gap between the two reserves is only a few 100 m wide and some trees and bushes remain.
4. The loss of mid-altitude forest has been severe in the Ulugurus and over large areas of the mountain no forest habitats remain between 800-1500 m altitude. As there are endemic plants and vertebrates within each altitudinal band, the loss of forest from this altitude is a serious issue. Available data indicate that some species of animals may have been lost from the Ulugurus, or been severely reduced in number. As the mid-altitude forests on the Kitundu Hills to the north of Uluguru North forest reserve continue to be deforested, then further species loss can be predicted.
5. The loss of forest on the village lands to the north of Uluguru North Forest Reserve has been severe and rapid over the past decade. The attempts by WCST to create Village Forest Reserves in this area should be encouraged and if possible, additional areas of not entirely deforested lands should be incorporated within these VFRs before the typical forest species are lost from the area. Currently this area is important for the Uluguru bush shrike and the loss of forest may result in a population decline in this species.
6. Altitudinal corridors along the Ruvu River and other riverine systems may be important to those species (birds and others) that move to lower altitudes during the cooler austral winter months (July to September). These corridors are being destroyed as riverine forests are cleared for farmland with unknown consequences to the species that use them. Fortunately, the Uluguru endemic

and Eastern Arc endemic birds do not undertake significant altitudinal migrations.

7. Local communities should participate more actively in the management of the Local Authority Forest Reserves given the lack of resources available to the District Government staff. Various forms of Participatory Forest Management are appropriate for these reserves. However, such PFM agreements should specify the need to halt deforestation in the local authority Forest Reserves. This is particularly important as many of these reserves are located in the middle and lower altitudes that have suffered the greatest rates of deforestation.
8. Many of the reserve borders need to be marked and beacons should be replaced. This work is particularly important in the largest reserves of Uluguru South and North as these have the greatest values for water catchment and biodiversity and are often surrounded by high human population densities.
9. Maps should be prepared of the local authority Forest Reserves where these are lacking.
10. Priority areas for further research in the mountains include a bird survey of Shikurufumi Forest Reserve and an overall biodiversity survey of the Village Forest Reserves and other remaining forests on the Kitundu Hills to the north of Uluguru North Forest Reserve.
11. Assessments of biodiversity values are also required for the 11 other Uluguru Forest Reserves (Nyandira, Nyandiduma, Vigoza, Pangawe East, Pangawe West, Ruggles Brise, Mindu, Ngomani, Kiwiwira, Dindili and Kitulanghalo) as the. Forest no longer exists in some of these reserves (e.g. Nyandira and Vigoza), but others contain areas of mid altitude forest that could support significant biodiversity values (e.g. Kitulanghalo). Other reserves are dominated by woodlands (e.g. Pangawe East and West, Ruggles-Brise) and may not contain narrowly endemic species, but this can only be determined by adequate survey work.

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Appendix I Annotated list of plant species collected during the UMBCP surveys.

Taxon	Species author	Altitudinal range (m)	Distribution	Life form	Habitat	Data source
ACANTHACEAE						
<i>Asystasia gangetica</i>	(L.) T. Anderson	1600 (250 - 2000)	K1,4,5,6,7; T1,2,3,4,5,6,7,8; Z; P; U4; Rwanda and Seychelles; pantropical	Herb		LEAP TROPICOS
<i>Asystasia moorei</i>	Ensermu, ined.			Shrub		TROPICOS
<i>Asystasia sp. nov. aff. A. leptostachya</i>	Lindau (Polhill 4640, etc.)					
<i>Barleria prionitis</i>	L.	170	T2,3,6,8; S. and W. Africa	Climber		LEAP TROPICOS
<i>Brachystephanus africanus</i>	S. Moore	300 - 1400	T1,6; U2; Malawi; Cameroon	Herb		TROPICOS
<i>Brillantaisia cicatricosa</i>	Lindau	1700 - 2200	U1,2; T3,5,6; Burundi	Shrub		LEAP TROPICOS
<i>Brillantaisia madagascariensis</i>	T. Anderson ex Lindau	940 - 1300	T1,2,3,5,6; Sudan, Ethiopia; Madagascar	Shrub		LEAP TROPICOS
<i>Brillantaisia stenolepis</i>	Sidwell	200 - 600		Shrub		TROPICOS
<i>Chlamydostachya spectabilis</i>	Mildbr.	1300 - 1900	T6	Shrub		LEAP TROPICOS
<i>Dicliptera mossambicensis</i>	Klotzsch	350 - 1200	K7; T6; Malawi, Zambia, Zimbabwe and Mozambique	Climber		LEAP TROPICOS
<i>Dicliptera umbellata</i>	(Vahl) Juss.	2700 (220?)	U2; T1,6,7; Ethiopia; Burundi; Cameroon	Shrub		LEAP TROPICOS
<i>Hypoestes forskalii</i>	(Vahl) R. Br.	200 - 590	T1,2,3,4,5,6,7; tropical Africa	Shrub		TROPICOS
<i>Hypoestes triflora</i>	(Forssk.) Roem. & Schult.	1300	T2,3,6,7; Malawi; Cameroon	Herb		TROPICOS
<i>Isoglossa lactea</i>	Lindau ex Engl.	250 - 800 (- 1700)	T2,3,6,7	Shrub		LEAP TROPICOS
<i>Justicia asystasioides</i>	(Lindau) M.E.Steiner	550 - 1250		Shrub		TROPICOS
<i>Justicia engleriana</i>	Lindau					TROPICOS
<i>Justicia interrupta</i>	(Lindau) C. B. Clarke	400 - 700	T2,3,6	Shrub		LEAP TROPICOS
<i>Justicia nyassana</i>	Lindau	600	U2; K1,2,4,6,7; T2,3,4,6,7,8; Burundi, Central African Republic, Malawi, Zambia	Herb		LEAP TROPICOS
<i>Justicia scandens</i>	Vahl	250		Herb		TROPICOS

<i>Justicia striata</i>	(Klotzsch) Bullock	250	K1,4,6; T1,2,3,6,7; U2; Malawi, Zimbabwe, Zambia, Mozambique, Cameroon, Ghana	Herb		LEAP TROPICOS
<i>Justicia tenella</i>	(Nees) T. Anderson	750	T6; P; D.R. Congo; Central African Republic, W. Africa, Madagascar	Herb		LEAP TROPICOS
<i>Mellera lobulata</i>	S. Moore	600 - 1000	U2; T1,3,4,6; Ethiopia, Malawi	Shrub		LEAP TROPICOS
<i>Metarungia pubinervia</i>	(T. Anderson) Baden		T2,6; Zambia			TROPICOS
<i>Mimulopsis arborescens</i>	C.B. Clarke		K3,4; T6	Shrub		LEAP TROPICOS
<i>Phaulopsis imbricata</i>	(Forssk.) Sweet	450 - 750	U2,4; K1,3,4,5,6,7; T1,2,3,4,6,7; Z; P; Malawi, Burundi, Cameroon, Gabon, Republic of Congo	Shrub		LEAP TROPICOS
<i>Pseuderanthemum hildebrandtii</i>	Lindau	1000 - 2500	K1,4,6,7; T2,3,6,8; Cameroon	Shrub		LEAP TROPICOS
<i>Stendandrium afromontanum</i>	(Mildbr.) Vollesen	950	T6	Herb		LEAP TROPICOS
<i>Thunbergia alata</i>	Bojer ex Sims	100 - 2000	U2-4; K1-7; T1-8; Z; pantropical	Creeping herb		LEAP TROPICOS
<i>Thunbergia kirkii</i>	Hook. f.	250	U3; K7; T6	Shrub		LEAP TROPICOS
ADIANTHACEAE						
<i>Adiantum lunulatum</i>	Burm. F.					
<i>Adiantum capillus- veneris</i>	L.	250 - 3000	U1-4; K1,3,4,6,7; T1-8;			LEAP
ALOEACEAE						
<i>Aloe bussei</i>	Berger	580 - 1500	T5-7;	Perennial herb	Rocky outcrops	FTEA
AMARANTHACEAE						
<i>Celosia hastata</i>	Lopr.			Herb		
<i>Celosia schweinfurthiana</i>	Schinz	3 - 1550	U2-4; K1,3, 5-7; T1-7; Sudan, Ethiopia, D.R. Congo and Angola	Shrub	As ground cover along forest rides, margins and clearings especially near water or scrambling in thicker forest, otherwise in roadside or coastal bushland or as a weed of cultivation.	FTEA; TROPICOS
AMARYLLIDACEAE						
<i>Hypoxis angustifolia</i>	Lam.	150 - 2400	T2,6,7; Uganda, Burundi, Cameroon.	Herb		TROPICOS
<i>Hypoxis galpinii</i>	Baker	2320		Herb		TROPICOS
ANACARDIACEAE						
<i>Rhus longipes</i> var. <i>longipes</i>		1 - 2100	U2; K3,4; T1-8; Z; D.R. Congo, Ethiopia, Mozambique, Angola, Zambia, Zimbabwe, Malawi	Shrub or small tree	Upland evergreen bushland and forest edges, riverine forest, termite hills and other ticketed places in woodland	FTEA

					descending to coastal forest and bushland in Tanzania.	
<i>Rhus pyroides</i> var. <i>pyroides</i>	Burch.	800 - 2700	U1-4; K1-6; T1-8; Cameroon to Ethiopia, also in Mozambique, Malawi, Zambia, Zimbabwe, South Africa, Lesotho	Shrub or tree up to 10 m high	Upland evergreen bushland, forest edges, on hill slopes and valleys, on lake shores and along river banks and in wooded grassland.	FTEA; TROPICOS
<i>Sorindeia madagascariensis</i>	Thouars ex DC.	1 - 1830	K4,7; T2,3,5-8; P;Z; Malawi, Mozambique, Mascarene Islands, Madagascar	Evergreen tree	Riverine, coastal and upland forest, often in wet or seasonally flooded places.	FTEA; TROPICOS
<i>Trichoscypha uluguruensis</i>	Mildbr.	1200 - 1800	T4, 6-8; S. D.R. Congo, Mozambique, Malawi, Zambia, Zimbabwe and Angola	Tree	Upland rainforest, riverine forest.	FTEA; TROPICOS
ANNONACEAE						
<i>Monodora grandidieri</i>	Baill.	250	K7; T3,6,8; Z; Somalia, Mozambique and Malawi	Shrub		LEAP TROPICOS
<i>Monodora junodii</i>	Engl. & Diels	1 - 1590	T3,5,6,8; Mozambique, Malawi, Zimbabwe, S. Africa	Shrub		LEAP TROPICOS
<i>Ophrypetalum odoratum</i> subsp. <i>longipedicellatum</i>	Verdc.	200 - 450	T6	Shrub		LEAP TROPICOS
ANTHERICACEAE						
<i>Chlorophytum comosum</i>	(Thunb.) Jacq.	0 - 2500	U1-4; K1,3-7; T1-8; Angola, Burundi, Gabon, Ghana, Ivory Coast, S. Africa, D.R. Congo	Plant	Undergrowth in rainforest and riverine forest on brown to black loamy clay, also in crevices in rocks along streams.	FTEA
<i>Chlorophytum filipendulum</i> subsp. <i>amaniense</i>	Bak.	30 - 650	K7 T3,6; Z	Plant	Coastal or gallery evergreen dry to moist forests on rocks	FTEA
APIACEAE						
<i>Centella asiatica</i>	(L.) Urb.	0 - 3480	U1-4; K1-7; T1-8; Z; P; Pantropical	Herb or creeper	Most commonly in damp grassland along rivers and by swamps and lakes	FTEA TROPICOS
APOCYNACEAE						
<i>Carvalhoa campanulata</i>	K. Schum.	350	K7; T3,6,7; Malawi	Shrub		LEAP TROPICOS
<i>Rauvolfia mannii</i>	Stapf	300 - 2440	U2; K4,7; T2,3,6-8; Burundi, Rwanda, D.R. Congo, Central African Republic, Gabon, Cameroon, Nigeria, Ghana	Tree		LEAP TROPICOS
<i>Schizogygia coffaeoides</i>	Baill.	0 - 500	K7; T3,6; Z	Shrub		LEAP TROPICOS
<i>Tabernaemontana ventricosa</i>	Hochst. ex A. DC.		U2,4; K3-7; T1,2,3,6-8; Z; P; Malawi, Zambia, D.R. Congo, Cameroon	Shrub		LEAP TROPICOS

ARACEAE						
<i>Amorphophallus stuhlmannii</i>	(Engl.) Engl. & Gehrm.	0 - 1400 m	T3, 6; not known elsewhere.	Plant robust	Evergreen forest, often on limestone.	FTEA; TROPICOS
<i>Anchomanes abbreviatus</i>	Engl.	0 - 800	K7; T3,6,8; not known elsewhere	Herb	Evergreen forest	FTEA
<i>Callopsis volkensii</i>	Engl.	45 - 800	K7; T3,6; ?Cameroon	Rhizome creeping	Lowland evergreen forest	FTEA
<i>Stylochiton salaamicus</i>	N. E. Br.	0 - 820 m	K7;T3,6,8;Z;not known elsewhere.	Seasonally dormant herb.	Lowland and evergreen forest, wooded grassland, termite mounds;	FTEA; TROPICOS
ARALIACEAE						
<i>Polyscias fulva</i>	(Hiern) Harms	1180 - 2160	U2-4; K5; T1-4,6,7; W. Africa, Malawi, Zambia, Zimbabwe, Angola, Democratic Republic of Congo, Burundi	Tree	Upland and lowland rain-forest, riverine forest, also upland grassland.	FTEA; TROPICOS
ASCLEPADIACEAE						
<i>Cryptolepis obtusa</i>	N. E. Br.	750 - 1100	T6; Malawi, Zambia	Climbing herb		TROPICOS
<i>Kanahia laniflora</i>	(Forssk.) R. Br.		T3,6; Ethiopia, Sudan, W. and S. Africa, Yemen	Shrub		TROPICOS
<i>Pergularia daemia</i>	(Forssk.) Chiov.		U2,4; T1,2,3,6,7, Z; Malawi, W. Africa, Pakistan	Climber		LEAP; TROPICOS
ASTERACEAE						
<i>Acmella uliginosa</i>	(Sw.) Cass			Herb		
<i>Adenostemma viscosum</i>	J. R. & G. Forst.	0 - 850	T6; Madagascar	Herb		TROPICOS
<i>Ageratum conyzoides</i>	L.	700 - 1700	U3,4; K1-7; T2-5; Z;	Herb		LEAP
<i>Anisopappus chinensis</i>	Hook. & Arn.			Herb		
<i>Aspilia mossambicensis</i>	(Oliv.) H. Wild		U1,3,4; K1-7; T1-8;	Shrub		LEAP
<i>Conyza attenuata</i>	DC.			Herb		
<i>Crassocephalum crepidioides</i>	(Benth.) S. Moore		U1-4; K1,3-7; T1-8;	Herb		LEAP
<i>Crassocephalum sarcobasis</i>	(DC.) S. Moore		U3; K2-7; T1-8; Ethiopia, Burundi, Zambia, Madagascar	Herb		LEAP; TROPICOS
<i>Emilia caespitosa</i>	Oliv.		U2,4; K1,5,7;	Herb		LEAP
<i>Ethulia pauciflora</i>	M. G. Gilbert	125 - 900	T6,8; nothern Mozambique	Annual herb	Moist sites in wooded grassland, usually on alluvium or black cotton soil	FTEA
<i>Gynura scandens</i>	O. Hoffm	1000 - 2100	U2,4; K3,4,6,7; T3,6,7;	Herb		LEAP
<i>Gynura valeriana</i>	Oliv.		K6; T2,3,6;	Shrub		LEAP
<i>Helichrysum kirkii</i>	Oliv. & Hiern	900 - 2488	T2,6,7; Malawi	Herb		
<i>Helichrysum</i>	Moeser	2300				TROPICOS

<i>longiramum</i>						
<i>Helichrysum odoratissimum</i>	(L.) Sweet	1700 - 3700	U1-3; K3,5; T2,4,7; Zimbabwe, Malawi, Mozambique, S. Africa	Herb		LEAP
<i>Helichrysum traversii</i>	Chiov.	1850 - 3000	K2,3,5; T2,3,7; Ethiopia	Herb		LEAP
<i>Microglossa pyrifolia</i>	(Lam.) O. Ktze.	1180 - 2200	U2-4; K3-5; T4-8; Z; P; Zambia, Cameroon, Malawi, Burundi	Shrub		LEAP
<i>Mikania chenopodifolia</i>	Willd.		U2; T3,4,7,8; Z; P; Rwanda, D.R. Congo	Climbing herb		LEAP
<i>Solanecio angulatus</i>	(Vahl) C. Jeffrey		U1-4; K2-5,7; T1-8;	Climbing succulent herb		LEAP
<i>Solanecio mannii</i>	(Hook. f.) C. Jeffrey		U1-4; K1-7; T1-8; Cameroon	Shrub or tree		LEAP; TROPICOS
<i>Synedrella nodiflora</i>	(L.) Gaertn.	20 -1500	T3,6; pantropical	Herb		TROPICOS
<i>Vernonia aemulans</i>	Vatke	1 - 1900	K4,6,7; T2-4,6-8; not known elsewhere	Annual herb	Disturbed sites such as roadsides, old cultivations, also in grassland, woodland, wooded grassland and bushland	FTEA
<i>Vernonia bruceae</i>	C. Jeffrey	1000 - 1200	T6,7 border; not known elsewhere.	Shrub, climber or small tree	Moist forest or forest margins	FTEA
<i>Vernonia glabra</i>	(Steetz) Vatke	0 - 2100	K1,4,5; T1-8; Z; Congo, Zambia, Malawi, Mozambique, Zimbabwe, Namibia, Botswana, South Africa	Perennial herb	Dry grassland, waste places like roadsides, woodland, grassland in the woodland zone	FTEA
<i>Vernonia holstii</i>	O. Hoffm.	900 - 2100	K3,4,6,7; T2-7; Cameroon, Congo, Rwanda, Zambia, Malawi, Mozambique, Zimbabwe	Woody herb or shrub	Margins of and clearings in dry evergreen forest, secondary bushland, maybe locally common	FTEA
<i>Vernonia lasiopus</i>	O. Hoffm.	1050 - 2650	U2-4; K3,4,6,7; T1-3,5,6; Rwanda Sudan and Ethiopia	Woody herb or shrub	Forest clearings, forest margins, secondary bush derived form forest, riverine thicket, secondary grassland in forest or dry bush zone, roadsides maybe abundant in abandoned cultivation	FTEA
<i>Vernonia stuhlmannii</i>	O. Hoffm.	350 - 1200	T3?,5,6,8; not known elsewhere	Woody herb or weak shrub	Woodland, wooded grassland and thickets	FTEA
BALSAMINACEAE						
<i>Impatiens walleriana</i>	Hook. f.	0-2000	K7; T2,3,6; Z, P; Mozambique, S. Malawi, E. Zimbabwe	Succulent perennial	In damp often shaded places in upland and coastal rainforest, particularly in riverine thickets, gullies and damp rocky places	FTEA
BEGONIACEAE						
<i>Begonia oxyloba</i>	Welw.	1100	K5; T3,7; Burundi, D.R. Congo, W. Africa	Herb		LEAP

CAMPANULACEAE						
<i>Lobelia baumannii</i>	Engl.	800 -2400	K4; T2-4, 6-8; E. D.R. Congo, Burundi, Zambia, Malawi, Zimbabwe and Mozambique.	Perennial herb	Forest floor or forest margins, often on rocks or stream banks in shade	FTEA
<i>Lobelia fervens</i>	Thunb.	0 - 1780	K1, 4, 7; T1,3,4,6-8; Z; P; Ethiopia, zimbabwe, Mozambique, Comoro Isl, Madagascar, Reunion, Brazil.	Perennial herb	Grassland, forest margins, roadsides, streamsides or on coastal sand, often in damp places.	FTEA
CANNACEAE						
<i>Canna indica</i>	L.	0 - 2500	U2-4; K3,4,7; T2-4,6,7; Z; P; Pantropical	Herb	Widespread in areas of high rainfall in disturbed places	FTEA
CELASTRACEAE						
<i>Maytenus undata</i>	(Thunb.) Blakelock	0 - 3150	U1-4; K1-7; T1-4,6,7; Z; W. Afr, Mad, Sud, Som, Yemen	Shrub	Forest, riverine forest, woodland, evergreen and coastal bushland	FTEA
CLUSIACEAE						
<i>Harungana madagascariensis</i>	Lam. ex Poir.	0 - 1800	U2-4; K4,5,7; T1,3,6,7; Z; P; widely spread throughout Tropical Africa.	Shrub	Lowland and upland rainforest	FTEA
<i>Hypericum quartinianum</i>	A. Rich.	1150 - 2250	U1,2; K2,3,?5; T4,6-8; Eth, Mal, Zai, Zam, Moz	Shrub	Rocky places, gulleys and river banks in upland grassland or deciduous woodland	FTEA
COMBRETACEAE						
<i>Combretum chionanthoides</i>	Engl. & Diels	50 - 170	K7; T3,6; not known elsewhere	Semi-scandent shrub or ? Tree.	Forest margins	FTEA
<i>Combretum molle</i>	G. Don	30 - 2300	U1-4; K1-7; T1-8; throughout the wooded grassland areas or Tropical and southern Africa; also in the Yemen.	Small tree	Wooded grassland and bushland forming pure stands on hillsides.	FTEA
<i>Combretum schumannii</i>	Engl.	0 - 1150	K4,7; T2,3,5,6,8; Malawi, Mozambique	Shrub or tree	Lowland rain forest, riverine forest and Brachystegia woodland to valley grassland.	FTEA
COMMELINACEAE						
<i>Pollia bracteata</i>	K. Schum.	1150 - 1375	T3, 6;	Herb		
<i>Pollia condensata</i>	C. B. Clarke			Herb		
<i>Stanfieldiella imperforata</i>	(C.B. Clarke) Brenan		U2,4; Ethiopia			LEAP
CONNARACEAE						
<i>Jaundea pinnata</i>	(P. Beauv.) Schellenb.	0 - 2500	U2,4; K4,7; T1-3,6,7; W. Africa, Sudan, Zimbabwe, Angola	Shrub		LEAP
<i>Rourea thomsonii</i>	(Baker) Jongkin			Shrub or liana		
CONVOLVULACEAE						

<i>Hewittia malabarica</i>	(L.) Suresh			Climber		
<i>Ipomoea involucrata</i>	P. Beauv.	100 - 2700	U2,3; K6 ; T 1-8; Z; Throughout tropical Africa from West Africa to Angola and northern Transvaal.	Herb	Grassland, forest, Brachystegia woodland and abandoned cultivated ground.	FTEA
<i>Ipomoea urbaniana</i>	(Dammer) Hall. f.	0 - 1500	U2,4; K7; T3,6,8; eastern Congo Republic	Liane	Upland and lowland rain-forest, rarely in grassland.	FTEA
<i>Ipomoea wightii</i>	(Wall.) Choisy	50 - 2400	U1-4; K1-6; T1-8; Z; Mozambique, Nyassaland, Zimbabwe, S. Africa also Madagascar and tropical Asia.	Herb	Open forest, scrub.	FTEA
<i>Jacquemontia paniculata</i>	(Burm. f.) Hall. f.	0 - 360	K7; T3,6,8; Z; P; Madagascar to SE Asia, Malaysia, tropical Australia and New Caledonia.	Twiner	Grassland, thickets and cultivations, often on sandy soil; in the coastal provinces.	FTEA
<i>Lepistemon owariense</i>	(P. Beauv.) Hall. f.	200 -1350	U1-4; K5,7; T2-4, 6, 8; Sudan Republic, Congo Republic, Mozambique and Nyassaland extending to Portuguese Guinea and Angola	Twiner	Lowland rainforest and riverine forest	FTEA
<i>Xenostegia medium</i>	(L.) Austin & Staples			Trailing herb		
CRASSULACEAE						
<i>Kalanchoe crenata</i>	(Andr.) Haw.	0 - 2300	U2-4; K3,5,7; T1-4, 6-8; Z; widespread in Tropical Africa from Guinea to Angola, Central African Republic, D.R. Congo, Rwanda, Burundi, Malawi, Zambia, Zimbabwe, South Africa, Arabia, naturalised in tropical America, India and Malaysia	Herb	Forest, bushland and grassland, mostly in moist and damp places, often among rocks by roadside in cultivated lands	FTEA
CUCURBITACEAE						
<i>Coccinia grandiflora</i>	Cogn.	100 - 1900	K7; T3,6,8; ?Malawi	Climber	Lowland and upland rain-forest.	FTEA
<i>Coccinia grandis</i>	(L.) Voigt	0 - 1680	U1-4; K1,2,4,5,7; T1-3, 6,8; Z northern tropical Africa eastwards from Senegal to Somali republic; Arabia; South America	Climber	Deciduous bushland, woodland and wooded grassland, dry evergreen forest and evergreen woodland.	FTEA
<i>Coccinia mildbraedii</i>	Harms			Herbaceous climber		
<i>Momordica anigosantha</i>	Hook. f.	300 - 1220	U2,4; K4,7; T3, 6; Z; Mozambique	Climber	Lowland rain and ground-water forest and forest remnants	FTEA
<i>Oreosyce africana</i>	Hook. f.			Climber		

<i>Peponium vogelii</i>	(Hook. f.) Engl.	80 - 2440	U2-4; K1,3-7; T1-3, 5-8; Z; west and Central tropical Africa from Ghana eastwards to Ethiopia and southwards through the Congo Republic to Angola; Mozambique; Seychelles.	Climber	Upland and lowland rain -and ground-water forest and upland bamboo thicket, also in woodland and bushland especially near open water.	FTEA
<i>Raphidiocystis chrysocoma</i>	(Schumach.) C. Jeffrey	300 - 1370	U2,4; T3,6; west Africa from Guinea Republic eastwards to Togo Republic.	Climber	Lowland rain-forest	FTEA
<i>Zehneria scabra</i>	(L. f.) Sond.	80 - 3350	U1-4; K1-7; T1-8; Z; tropical Africa and South Africa, Arabia, peninsular India, Java, Philippines	Herb climbing or trailing	Rain and swamp or other ground water forest, riverine forest, grass thicket, seasonal swamp and damp places generally in bushland and woodland; also a weed of roadsides and plantations.	FTEA
CYCADACEAE						
<i>Encephalartos hildebrandtii</i>	A. Br. & Bouche	0 - 600	U2; K7; T3,6; Z;	Trees		LEAP
CYPERACEAE						
<i>Cyperus cyperoides</i>	(L.) O. Ktze.	150 - 2150	U3,4; K1-4,6,7; T1-8; Ethiopia, D.R. Congo, Burundi, S.Africa, Somalia			LEAP
<i>Pycreus elegantulus</i>	(Steud.) C.B. Clarke					
<i>Scleria lithosperma</i>	(L.) Sw.	80 - 500	K7; T3,6;			LEAP
<i>Scleria racemosa</i>	Poir.		U1; K5,7; T3,4; Z; Ethiopia, Zimbabwe			LEAP
DICHAPETALACEAE						
<i>Dichapetalum madagascariense</i>	Poir.	0 - 2400	U2,4; K7; T1,2,6; Z; tropical Africa from Senegal to Angola and Mozambique, Comores, Madagascar	Liana	Rain forest, riverine forest and in associated bushland.	FTEA
DIOSCOREACEAE						
<i>Dioscorea dumetorum</i>	(Kunth) Pax	0 - 1650	U1-4; K7; T1,3,4,6-8; Z; Senegal, Ethiopia, Mozambique, Zimbabwe, S.Africa.	Shrub		LEAP
<i>Dioscorea sansibarensis</i>	Pax	0 - 900	U2; K7; T6-8; Z; P; Sudan, S. Africa, Mozambique, Madagascar	Shrub		LEAP
DRACAENACEAE						
<i>Dracaena fragrans</i>	(L.) Ker-Gawl		U2-4; K5; T1,3,4,6; D.R. Congo, S. Africa			LEAP
ERICACEAE						

<i>Agarista salicifolia</i>	(Comm. ex Lam.) G. Don			Shrub or tree		
EUPHORBIACEAE						
<i>Acalypha fruticosa</i>	Forssk	0 - 1890	U1-3; K1-7; T1-3, 6, 7, ?8; Z; Sudan to Somalia and south to Burundi with outlying stations in Namibia, S. Malawi and C. Mozambique, So. Arabia, S. India, Ceylon, Burma	Shrub or small tree	Coastal and deciduous bushland and thicket, wooded grassland, often riverine, on rocky shores or outcrops, and in other places with local water catchment and less grass competition, becoming common in over grazed places	FTEA
<i>Acalypha ornata</i>	A. Rich	0 - 2000	U1-4; K2, ?4, 5-7; T1-8; from Nigeria to Eritrea and south to Angola, Botswana, Zimbabwe and Mozambique.	Woody herb or shrub	Forest undergrowth and edges, wooded grassland, deciduous woodland and thicket, often riverine or in rocky places, also in secondary associations and disturbed ground.	FTEA
<i>Acalypha racemosa</i>	Wall. ex Baill.	100 - 2000	U1-4; K1,3-7; T1-3,5,6,?8	Perennial herb or sub-shrub.	Forest, open places, edges and riverine, sometimes in rocky or disturbed places nearby.	FTEA
<i>Alchornea laxiflora</i>	(Benth.) Pax & K. Hoffm.	10 - 1600	U1-4; K5,7; T1,4-6,8; from Nigeria eastwards to Ethiopia and south to South Africa.	Shrub or small tree	Evergreen forest, associated bushland in fire-protected places, also deciduous and riverine thickets near coast	FTEA
<i>Bridelia cathartica</i>	Bertol. F.	0 - 2000	K7; T1-8; Z; P; from Sudan, Ethiopia, and Somalia south-west to D.R. Congo and south to South Africa	Shrub or small tree	Woodland, bushland and thicket, commonly riverine or in rocky places, persisting to secondary associations	FTEA
<i>Dalechampia scandens</i> <i>var. hildebrandtii</i>	L.	0 - 1500	U1: K1-4, 6,7; T 2-7; Cape Verde Is. To S. Arabia, Pakistan and India south to Angola and Mozambique.	Twiner	Deciduous, coastal and riverine bushland and thicket often in rocky or seasonally wet places, extending into disturbed habitats.	FTEA
<i>Drypetes natalensis</i>	(Harv.) Hutch.	15 - 1500	K4,7; T2-6,8; Z; Sudan, Mozambique, Malawi, Zambia, S. Africa	Shrub	Dry evergreen, riverine and semi-deciduous forest. Often in rocky places.	FTEA
<i>Drypetes reticulata</i>	Pax	0 - 500 (1800)	K?1, 7; T3, 6-8; Z; Somalia, Mozambique, Zimbabwe, South Africa	Shrub or slender tree.	Evergreen forest and thicket, often riverine or in rocky places.	FTEA
<i>Euphorbia quadrialata</i>	Pax	400 - 1300	T3, 6; not known elsewhere.	Tree	Rocky slopes and gneiss outcrops with open deciduous bushland.	FTEA
<i>Hymenocardia ulmoides</i>	Oliv.	50 - 1550	T3,5,6,8; from Cameroun south to Angola, east to S. Sudan and Tanzania and southeast to S. Africa.	Medium sized or small tree	Dry evergreen forest and associated bushland or thicket, persisting in wooded grassland and disturbed places.	FTEA
<i>Meineckia fruticans</i> var.	(Pax) Webster	30 - 220	K7; T3; not known elsewhere.	Shrub	On coral and other rock outcrops, in	FTEA

<i>engleri</i>					lowland wet evergreen and riparian forest.	
<i>Meineckia fruticans</i> var. <i>fruticans</i>	Pax (Webster)	6 - 1000	K7; T3,4,6,7; not known elsewhere.	Shrub	Limestone and coral outcrops, rocky, sometimes riverine places in forest and coastal bushland.	FTEA
<i>Mildbraedia caprinifolia</i>	(Pax) Hutch.	0 - 1675	K7; T3,4,6,8; Z; Mozambique	Shrub or small tree.	Forest undergrowth and edges, coastal woodland, riverine and secondary associations	FTEA
<i>Phyllanthus capillaris</i>	Schumach. & Thonn.			Shrub		
<i>Phyllanthus glaucophyllus</i>	Sond.					
<i>Phyllanthus nummulariifolius</i>	Por.	0 - 2450	U1 - 4; K1-5; T1-8; Z; P; from Sierra Leone to Sudan and south to South Africa; also in Madagascar, Mascarene Islands and Seychelles	Woody herb or shrub	Woodland, wooded grassland and forest edges, extending to upland grassland and bushland, often in seasonally wet and disturbed places.	FTEA
<i>Sclerocroton integerrimus</i>	Hochst.					
<i>Shirakia elliptica</i>	(Hochst.) Kruijt			Tree		
<i>Shirakiopsis elliptica</i>	(Hochst.) Esser			Tree		
<i>Suregada zanzibariensis</i>	Baill.	0 - 1600	K7; T3,6,8; Z; P. Somalia, Mozambique, Zimbabwe, Madagascar and South Africa	Shrub or small to large tree.	Coastal forest, woodland and bushland, common in places, occasionally found in similar places inland and at much higher altitudes.	FTEA
<i>Tragiella natalensis</i>	(Sond.) Pax & K. Hoffm.	80 - 2300	U1,3,4; K1-7; T1-3,6; Sudan, Mozambique, Malawi, Zimbabwe, Zwaziland and South Africa	Herb	Forest edges, undergrowth, and associated bushland, riverine lakesides often in disturbed places.	FTEA
FABACEAE						
CAESALPINIOIDEAE						
<i>Dialium holtzii</i>	Harms	10 - 460	T3, 6-8; Mozambique	Tree	Lowland dry evergreen forest, riverine and swamp-forest, woodland; perhaps also in lowland forest.	FTEA
<i>Senna hirsuta</i>	(L) Irwin & Barneby	550 - 1220	U4; T3,6; originally from topical America, but now established in various parts of the Old World tropics.	Shrubby herb	A naturalised weed of plantations and cultivated ground in lowland rain forest areas; said to be v. common in the old cultivation in Kimobza Forest Reserve.	FTEA
<i>Albizia petersiana</i> subsp. <i>petersiana</i>				Shrub		
<i>Chamaecrista</i>	(L.) Standley	0 - 2740	Widespread in the tropics of the old	Herb	Clearings in forest, forest margins,	FTEA

<i>mimosoides</i>			world.		wooded grassland, grassland, cultivated and waste ground, sandy river beds, lake and sea shores.	
<i>Senna petersiana</i>	(Bolle) J. M. Lock	12 - 2130	U1-4; K3,5; T1,4,6-8; Z; eastern Africa from Ethiopia and the Sudan Republic southwards to Mozambique and the Transvaal, extending westwards to Central African Republic and Cameroun Republic; also in Madagascar.	Shrub or tree	In or on edge of rainforest, riverine forest, deciduous woodland, coastal evergreen bushland and wooded grassland.	FTEA
<i>PAPILIONOIDEAE</i>						
<i>Crotalaria laburnifolia</i>	L.	0 - 1850	U1,3,4; K1-7; T1-8; Eastern Congo, Rwanda, Sudan Ethiopia and Somali Republic, Mozambique, Malawi, Zambia and Zimbabwe, also Mascarene Isl, India Ceylon, and Malesia to N.E. Austratia	Bushy herb	Deciduous woodland and bushland, grassland and secondary scrub, also persisting on roadsides and cultivated ground.	FTEA
<i>Crotalaria laburnoides</i>	Klotzsch	0 - 1250	U; K7; T3,5,6,8; Z,P.	Erect annual	Grassland, sand dunes, coral outcrops and bushland near coast, less commonly in land at lake sides and in deciduous bushland, also persisting on cultivated ground and waste places.	FTEA
<i>Crotalaria natalitia</i>	Meissn.	0 - 3000	U1-4; K1-7; T1-8; Z; Eastern Congo, Ethiopia, Mozambique, Malawi, Zambia, Zimbabwe south to Natal, Angola.	Woody herb or small shrub	Deciduous woodland and bushland, riverine forest and margins of upland rainforest, upland grassland and evergreen bushland, also persisting on roadsides and cultivated ground.	FTEA
<i>Crotalaria vasculosa</i>	Benth.	0 - 1650	U4; K5,7; T1-3, 5,6,8; Z; Mozambique, Malawi, Zimbabwe and South Africa.	Annual	Grassland and Brachystegia woodland, often on sandy soil, also persisting on roadsides and cultivated ground.	FTEA
<i>Crotalaria goodiiiformis</i>	Vatke	75 - 2100	K1,4,6,7; T1-8; Mozambique, Eastern Congo.	Bushy shrub	Margins and clearing of lowland and upland rain forest, dry evergreen forest, deciduous woodland and bushland, wooded grassland also persisting on abandoned cultivations.	FTEA
<i>Desmodium gangeticum</i>	(L.) DC.	0 - 2000	U1-4; K3,4,7; T2-4, 6-8; Z; throughout the old world tropics; said to be introduced in America.	Perennial herb	Deciduous woodland, wooded and open grassland, riverine forest and swampy places.	FTEA
<i>Desmodium repandum</i>	(Vahl) DC.	1000 - 3000	U1-4; K1-7; T1-8; tropical and subtropical Africa, Madagascar,	Perennial herb	Occasional in shady grassland and marginal areas of cultivated land, but	FTEA

			Mascarene Is., India and Malesia		more often one of the dominant components of shaded places in dry evergreen forest or rain forest aor at the forest margin.	
<i>Desmodium tortuosum</i>	(Sw.) DC.	0 - 1100	U4; T1-4, 6,8; throughout tropical and subtropical areas of America; introduced and naturalised throughout the tropics of the old world.	Herbaceous from a woody base.	Roadsides, grassy places, abandoned plantations.	FTEA
<i>Dolichos trilobus</i>	L.	0 - 450 (1200)	K5,7; T1-3, 5-7; Z; P; Ehtiopia, Mozambique, Zimbabwe, Angola, South Africa also Arabia and India to Ceylon, China and Philippines	Perennial climbing herb	Grassland, bushland and forest	FTEA
<i>Indigofera mildbraediana</i>	Gillett	400	T6; Nigeria, Gabon, Congo, Central Africa Republic Sudan, Angola	Semi-woody branching herb.	Scattered tree grassland.	FTEA
<i>Indigofera rhynchocarpa</i>	Bak.	500 - 2150	T1-8; Central African Republic, Congo, Rwanda, Burundi, Mozambique, Malawi, Zambia, Zimbabwe and Angola	Shrub	Brachystegia woodland	FTEA
<i>Indigofera trita subsp. scabra</i>	L. f.	0 - 2200	U1,2; K1,2,4-7; T1-8; Z; P; Senegal to Ethiopia, Congo, Mozambique, Zimbabwe, Angola, South West Africa, South Africa	Erect woody herb	Chiefly in secondary growth.	FTEA
<i>Indigofera vohemarensis</i>	Baill.	0 - 1800	U1-4; K1-7; T1-8; Z; P; Congo, Ethiopia, Mozambique and Madagascar.	Erect annual or perennial	Grassy and stony slopes.	FTEA
<i>Macrotyloma axillare subsp. glabrum</i>	(E. Mey.) Verdc.	0 - 2520	U1-4; K3,4,6,8; T1-8; Z; P; Congo, ehtiopia, Arabia, Nigeria, Somali Republic, Mozambique, Zambia, Zimbabwe, southAfrica, Madagascar, Mauritius and Sri Lanka.	Perennial herb	Grassland, bushland, open forest, seasonally flooded grassland, thicket.	FTEA
<i>Millettia usaramensis</i>	Taub.	10 - 700 (1200)	K7; T1,3,6,8; Z; Mozambique)	Shrub or small tree	Wooded grassland and margins of lowland forest.	FTEA
<i>Mucuna poggei subsp. pesa</i>	(De Wild.) Verdc.	360 - 1950	U2; K5; T3-8; Congo, Mozambique, Malawi, Zimbabwe	Large liane	Bushland , riverine forest and swamp-forest.	FTEA
<i>Ormocarpum sennooides subsp. zanzibaricum</i>	(Willd.) DC.	0 - 600	K7; T3,6,8; Z; non known elsewhere	Shrub or small tree	Scrub on coral rock near shore, in undergrowth of forest or woodland and shady places by streams	FTEA
<i>Pseudarthria hookeri</i>	Wight & Arn.	0 - 2100	U1-4; K3-7; T1-8; Z; Cameroon,	Erect woody	Grassland, grassland with scattered trees	FTEA

			Congo, Burundi, Ethiopia, Sudan, Malawi, Mozambique, Zambia, Zimbabwe, Angola, N.E. South Africa; formerly cultivated Mauritius.	herb or subshrub	and thicket, old cultivations, swamp edges.	
<i>Pueraria phaseoloides</i> subsp. <i>javanica</i>	(Roxb.) Benth.	0 - 1260	T?1; Z; E. Asia, Malesia and Indonesia, now widely cultivated in the tropics.	Climber	Grassland and bushland	FTEA
<i>Rhynchosia congensis</i> subsp. <i>pseudobuettneri</i>	Bak.	0 - 45 (780)	T3; apparently endemic to E. Usambaras.	Climber or trailer	Rain forest edges.	FTEA
<i>Rhynchosia hirta</i>	(Andr.) Meikle & Verdc.	0 - 1 800	U2-4; K3-7; T1-8; Z; P; widespread in tropical Africa from N. Nigeria and Sudan to Central Africa and NE. South Africa also in the Mascarene Islk, India and Ceylon	Creeper or climber	Forest edges, grassland with scattered trees, hillside bushland and cultivations;	FTEA
<i>Rhynchosia luteola</i>	(Hiern) K. Schum.	300 - 1350	T3, 4, 6-8; Nigeria, Congo, Burundi, Mozambique, Malawi, Zimbabwe and Angola.	Robust sticky climber	Evergree forest margins, Brachystegia, Uapaca woodland, bushland	FTEA
<i>Rhynchosia malacophylla</i>	(Spreng.) Boj.	0 - 1500	U1; K1-7; T2,3,5; Z; Sudan, Somali Republic, Ehtiopia	Perennial or climbing herb	Deciduous bushland, Acacia scrub, sometimes in plantations.	FTEA
<i>Teramnus labialis</i>	(L. f.) Spreng.	0 - 1080	U1, 2, 3; K1, 3-7; T2,3,6-8; Z; P; Arabia, Sudan, Mali, Principe, Mozambique, Zambia, Zimbabwe, Mauritius, Reunion, Seychelles, Comoro Isl, Madagascar also in the West Indies and Guyana.	Perennial climber	Grassland, bushland, evergree forest.	FTEA
<i>Vigna fischeri</i>	Harms	1000 - 2250	K4,5; T2,3,6-8; Cameroon, Burundi, Ethiopia, Malawi and Zambia	Perennial herb	Swampy grassland with scattered shrubs, upland grassland with scattered trees, forest edges, old cultivations.	FTEA
<i>Vigna reticulata</i>	Hook. f.	0 - 2460	U1-4; K3,7; T1,3,4,6-8; Z; widespread in tropical Africa from Sierra Leone to Angola, Ethiopia, Mozambique and Zimbabwe, also in Madagascar.	Climbing herb	Grassland, bushland or grassland with scattered trees, usually on damp or swampy ground.	FTEA
FLACOURTIACEAE						
<i>Flacourtia indica</i>	(Burm. f.) Merr.	0 - 2400	U1,3,4; K2-5, 7; T1-8; Z; widespread in tropical and subtropical Africa, Madagascar, Mascarenes and Seychelles, also in Asia and Malesia, sometimes cultivated for its edibl	Shrub or tree	Woodland, wooded grassland and bushland. Often riparian.	FTEA

			fruits.			
<i>Oncoba welwitschii</i>	Oliv.	800 - 1900	T3,6-8; Nigeria to D.R. Congo and Angola also in Malawi and Mozambique	Shrub or tree	Lower storey of rain forest, dry evergreen forest and riverine forest, also in secondary growth.	FTEA
<i>Rawsonia lucida</i>	Harv. & Sond.	50 - 1900	U2,3; K4-7; T1-3, 6-8; P; Somali Republic, Sudan, Angola, D.R. Congo, Malawi, Zambia, Zimbabwe, Mozambique, Swaziland, South Africa	Shrub or tree	Understorey and shrub layer of lowland and upland rain forest, dry evergreen forest, semi-swamp and riverine forest.	FTEA
GERANIACEAE						
<i>Geranium vagans</i>	Baker			Herb		
GESNERIACEAE						
<i>Streptocarpus glandulosissimus</i>	Engl.	2700	U2; K1,4,7; T2,3,6,7; Rwanda, Burundi	Herb		LEAP
<i>Streptocarpus sp.</i>	Lindl.					
GROSSULARIACEAE						
<i>Grevea eggelingii subsp. eggelingii</i>	Milne-Redh.	420 - 600	T3,6;	Shrub		
ICACINACEAE						
<i>Alsodeiopsis schumannii</i>	(Engl.) Engl.	900 - 2000	T3,6,7; not known elsewhere.	Tree or shrub	Lowland and upland rain-forests.	FTEA
<i>Leptaulus holstii</i>	(Engl.) Engl.	700 - 1200	U4; T1,3-6, 8; Congo Republic and Angola	Shrub or small tree	Lowland rain forest.	FTEA
IRIDACEAE						
<i>Gladiolus dalenii subsp. dalenii</i>		300 - 3600		Herb	Open grassland and woodland sometimes in seasonally flooded valley grassland.	FTEA
LAMIACEAE						
<i>Hoslundia opposita</i>	Vahl		U2,3; K1-6; T2-4, 6; Burundi, Somalia, Eritrea, Sudan.	Shrub		LEAP
<i>Leonotis ocymifolia</i>	(Burm. f.) Iwarsson			Shrub		
<i>Leucas densiflora</i>	Vatke		U2; K3-6; T2,3,5,6;	Shrub		
<i>Leucas glabrata</i>	(Vahl) R. Br.			Herb		
<i>Ocimum gratissimum</i>	L.			Shrub		
<i>Platostoma denticulatum</i>	Robyns			Herb		
<i>Plectranthus amboinicus</i>	(Lour.) Spreng.			Herb		
<i>Plectranthus laxiflorus</i>	Benth.					
<i>Plectranthus luteus</i>	Gurke			Herb		
<i>Plectranthus parvus</i>	Oliv.					

<i>Plectranthus tetragonus</i>	Gurke			Shrub		
<i>Tinnea aethiopica subsp. stolzii</i>	(Robyns & Lebrun) Vollesen			Shrub		
LAURACEAE						
<i>Cinnamomum verum</i>	J. Presl	Introduced	Introduced from E. Asia	Small tree		
LILIACEAE						
<i>Aloe bussei</i>	A. Berger	580 - 1500	T5-7;	Herb		LEAP
<i>Asparagus asparagoides</i>	(L.) Druce		K4,7; T7; Burundi, D.R. Congo, S. Africa	Climber		LEAP
<i>Chlorophytum filipendulum subsp. amaniense</i>	(Engl.) Nordal & A.D. Poulsen			Herb		
<i>Chlorophytum holstii</i>	Engl.			Herb		
<i>Sansevieria kirkii</i>	Baker			Herb		
LOGANIACEAE						
<i>Anthocleista grandiflora</i>	Gilg			Tree		
<i>Strychnos usambarensis</i>	Gilg	75 - 2000	U1-3; K4,6; T3,5; Mozambique, Zimbabwe and South Africa.	Tree or shrub		FTEA
LORANTHACEAE						
<i>Agelanthus elegantulus</i>	(Engl.) Polhill & Wiens					
<i>Agelanthus krausei</i>	(Engl.) Polhill & Wiens					
<i>Englerina inaequilatera</i>	(Engl.) Gilli	(700-) 1400-2650	T4-8; easternmost Zambia, Malawi and Mozambique.	Shrub	Montane forest, often abundant at edges, extending down to drier forest on Rondo Plateau and into forest-woodland transition zones, on a wide variety of hosts.	FTEA
<i>Oliverella hildebrandtii</i>	(Engl.) Tiegh.			Parasitic shrub		
MALVACEAE						
<i>Abutilon mauritianum</i>	(Jacq.) Medik.	750 - 2250	U2,3; K4,7; T3-8; D.R. Congo, Ethiopia	Herb		LEAP
<i>Gossypoides kirkii</i>	(Mast.) Hutch.		T6,7,8;			In LEAP as Gossypium
<i>Hibiscus faulknerae</i>	Vollesen		K7; T6,8;	Shrub or tree		LEAP
<i>Hibiscus surattensis</i>	L.	1450	U1-4; K3,7; T1,3,4,6,8; Mozambique, Malawi, Zambia,	Herb		LEAP

			Burundi, D.R. Congo.			
<i>Pavonia urens</i>	Cav.	850 - 2350	K3,6; T7; Ethiopia	Shrub		LEAP
<i>Sida javensis</i>	Cav.	50 - 1750	U1,2,3,4; K1-7; T7,8; Z; P; D.R. Congo, Sudan, Ethiopia, Eritreaa	Herb		LEAP
<i>Sida rhombifolia</i>	L.			Small shrub		
<i>Wissadula rostrata</i>	(Schumach. & Thonn.) Hook. f.	700	U4; K2,5; T2-4,6-8; Burundi, Madagascar	Herb		LEAP
MARANTACEAE						
<i>Marantochloa leucantha</i>	(K. Schum.) Milne-Redh.	750 - 1200	U2,4; T1,3,6; Sierra Leone to Angola, D.R. Congo and Sudan	Herb	Clearings and secondary growth in rain forest.	FTEA
MELASTOMATACEAE						
<i>Calvoa orientalis</i>	Taub.	940 - 1800	U2,4; T1,3,6; Cameroun, Central African Republic and D.R. Congo	Herb	Clearings and margins of rain forest	FTEA
<i>Dissotis rotundifolia</i>	(Sm.) Triana	0 - 1900	U2-4; K7; T1,3,4, 6-8; Z; P; widespread in tropical Africa from Sierra Leone southwards to Angola and extending eastwards through D.R. Congo and E. Africa to Zimbabwe and Mozambique; introduced to Malesia	Herb	Margins of rain-forest, riverine forest , flood plains and valley grassland, swamps, upland grassland in moist places.	FTEA
<i>Gravesia pulchra</i> var. <i>glandulosa</i>	(Gilg) Wickens	1000 - 2000	T6; not known elsewhere.	Woody herb or shrub	Upland rain-forest	FTEA
<i>Memecylon "sp. aff. verruculosum Brenan, not matched."</i>	L.					
<i>Tristemma mauritianum</i>	J. F. Gme	775 - 1950	U1-4; K5,7; T1,3,4,6,8; P; widespread in tropical Africa from Senegal eastwards to Ehtiopia and southward to Angola, Zimbabwe and Mozambique, also in Madagascar and Mascarene Island	Herb	Marshy clearings in rain-forest, swampy riverine forest	FTEA
<i>Warneckea amaniensis</i>	Gilg	40 - 600	K7; T3,6; not known elsewehre	Shrub or small tree	Lowland rain-forest and riverine forest	FTEA
MELIACEAE						
<i>Pseudobersama mossambicensis</i>	(Sim) Verdc.	60 - 300	K7; T3,6,8; Mozambique and South Africa.	Tree	In understorey at edges of moist lowland forest.	FTEA
<i>Trichilia emetica</i>	Vahl	10 - 1300	U1-3; K1, 3-7; T 1-8; Z	Tree	Coastal forest, drier types of riparian forest and riparian woodland; more rarely	FTEA

					in rocky outcrops or in wooded grassland.	
<i>Turraea kimbozensis</i>	Cheek	300 - 450	T6; not known elsewhere.	Treelet	Lowland (groundwater) rain-forest on limestone;	FTEA
MENISPERMACEAE						
<i>Dioscoreophyllum volkensii</i>	Engl.	1140	K7; T3,6,7; P; W. Africa	Creeper		LEAP
MONIMIACEAE						
<i>Xymalos monospora</i>	(Harv.) Baill. ex Warb.	900 - 2700	U1-4; K1, ?2; 3-7; T1-4, 6, 7; eastern Africa from Sudan Republic and eastern Congo Republic to South Africa, also Cameroon Highlands and Fernando Po.	Shrub or small tree	Lowland and upland rain forest, often a co-dominant in forests on isolated mountain-tops in dry country	FTEA
MORACEAE						
<i>Dorstenia bicaudata</i> sp. aff.	Peter	800 - 900	T3; not known elsewhere.	Herb	Rain-forest.	FTEA
<i>Dorstenia hildebrandtii</i>	Engl.	0 - 2100	U2-4; K1-7; T1-7; D.R. Congo, Rwanda, Burundi, Mozambique	Herb	Granitic, coral and limestone outcrops from open forest to woodland, bushland and succulent thickets, often near streams or in local water catchment areas, sometimes in shaded forest sites.	FTEA
<i>Dorstenia kameruniana</i>	Engl.	0 - 1300	U2,4; K7; T3,6,7; extending to Angola and Cameroun , also in W. Africa.	Shrub or under-shrub	Undergrowth of evergreen forests. Sometimes in secondary growth.	FTEA
<i>Dorstenia schliebenii</i>	Mildbr.	300 - 2000	T 6-8; Malawi	Herb	Rain-forest, often among rocks.	FTEA
<i>Dorstenia tayloriana</i>	Rendle	0 - 1950	K3,7; T3,6; Mozambique	Herb	Evergreen forest, principally coastal	FTEA
<i>Dorstenia zanzibarica</i>	Oliv.	0 - 2400	K4,6,7; T2,3,6?; Z; not known elsewhere	Herb	Rocks, cliffs, epiphytic or in ground humus, in various habitatas for forest to succulent and deciduous bushland and thicket.	FTEA
<i>Ficus bussei</i>	Mildbr. & Burret	0 - 550	K7, T3, 5, 6, 8; Somalia, Mozambique, Malawi, Zambia, Zimbabwe.	Tree	Lowland forest, riverine, swamp forest and flood plains.	FTEA
<i>Ficus natalensis</i>	Hochst.			Tree		
<i>Ficus sur</i>	Forssk	0 - 2300	U1-4; K1,3-7; T1-8; Z; P; extending to Yemen, Cape Verde Isl. Angola and South Africa.	Tree	Forest, riverine, wooded grassland, often left in cleared places.	FTEA
<i>Ficus thonningii</i>	Bl.	350 - 2500	U1-4; K1-7; T1-8; extending to Cape Verde Isl, Angola, Ethiopia and	Tree	Forest, woodland, bushland and wooded grassland, sometimes along rivers and	FTEA

			South Africa.		lakes or among rocks, planted for ornament and bark cloth.	
<i>Ficus vallis-choudae</i>	Del.	450 - 1800	U1,2,4; K1-7; T 2-7	Tree	Riverine, lakesides, ground water forest.	FTEA
<i>Mesogyne isignis</i>	Engl.	500 - 1300	T3,6; S. Tome	Shrubs or trees.	Rainforest	FTEA
MYRICACEAE						
<i>Morella salicifolia</i> <i>subsp. kilimandscharica</i>	(A. Rich.) Verdc. & Polhill	(800-) 1100 - 2800	K4-7, T2,3,5-8, Zambia, Malawi	Shrub or small tree	Upland rain-forest, Agauria - Xymalos etc, particularly near upper and lower limits, extending into upland grassland and bushland, exposed rocky outcrops and the ericaceous zones of upland moor.	FTEA
OCHNACEAE						
<i>Ouratea sacleuxii</i>	(Tiegh.) Beentje			Tree		
ONAGRACEAE						
<i>Ludwigia erecta</i>	L.	0 - 1100	T3,4,6,8; P; widespread in Tropical Africa.	Herb	Imperfectly known, probably various wet habitats.	FTEA
ORCHIDACEAE						
<i>Calanthe sylvatica</i>	(Thouars) Lindl.			Tree		
<i>Oeceoclades saundersonii</i>	(Richb. F.) Garay & P. Taylor					
<i>Platyplepis glandulosa</i>	(Lindl.) Rchb. F.		U4; T3,7; Mozambique, Malawi, Zambia, D.R. Congo, Sudan, W. Africa, Angola, S. Africa	Herb		LEAP
OXALIDACEAE						
<i>Oxalis corniculata</i>	L.	10 - 2950	U1-4; K2-7; T1-4, 6-8; Z; P; widespread in most tropical and many temperate countries	Herb	Weed in cultivation, distrubed ground, lawns and roadsides.	FTEA
PANDANACEAE						
<i>Pandanus rabaiensis</i>	Rendle	1 - 1400	K7; T3,6,7; Z; P;	Tree		LEAP
PASSIFLORACEAE						
<i>Adenia lindiensis</i>	Harms	0 - 1200	K7; T3,6,8; not known elsewhere	Climber	Shrub layer and eges of evergreen forest and associated bushland	FTEA
<i>Passiflora edulis</i>	Sims	0 - 2500	U4; K4; T2,3,6,7; widely cultivated.	Climber	Often cultivated fo the flavoured fruit and escaped in forest edges, thickets and distribted places.	FTEA
PIPERACEAE						

<i>Peperomia blanda</i>	(Jacq.) Kunth	250 - 1800	U2,3; K4-7; T1-3, 6,7, from Yemen to South Africa west to D.R. Congo, Madagazcar, Mascarene Isl, India, Burma to South America	Erect plant	Bare but often shady rocky places, evergreen scrub and 'dry' forest also margin of standing water and springs, often with Aloe and Aeollanthus or in riverine thickets, rarely an epiphyte	FTEA
<i>Peperomia molleri</i>	C. DC.			Herb		
<i>Piper capense</i>	L. f.	650 - 2500	U2-4; K1,2,3-6,7; T1-4, 6-8; widespread in Africa from Sierra Leone to Cameroon, Rio Muni, Bioko, Sao Tome to D.R. Congo, Twanda, Burundi, Sudan and Ethiopia south to Mozambique, Zimbabwe, Malawi Swaziland and South Africa.	Shrub or subshrub	Forest undergrowth in wet places, swampy forest edges, mixed bamboo-forest also upland scrub and thicket near streams ,grassland and tree clumps.	FTEA
<i>Piper umbellatum</i>	L.	(0-)150 - 1800 (- 2100)	U2-4; K1,3,4,5; T2-5,6,7; Z; Guinea Bissau to Angola, D.R. Congo, Sao0 Tome, Bioko, So. Sudan, Moazambique, Malawi Zimbabwe, Seychelles, Madagascar, Mascareine is; pantropical	Shrub or woody herb	Evergreen forest undergrowth, swamp forest, elephant grass, river banks, old rubber plantations always in damp places	FTEA
PITTOSPORACEAE						
<i>Pittosporum goetzei</i>	Engl.			Tree		
POACEAE						
<i>Cymbopogon giganteus</i>	Chiov.	0 - 2300	U1,3,4; K2,3; T1,3-8; Z; Tropical Africa	Herb		LEAP
<i>Imperata cylindrica</i>	(L.) Rausch.	0 - 2100	U1-4; K3,5-7; T1,3-8; Z; P; Old World Tropics	Herb		LEAP
<i>Leptaspis cochleata</i>	Thw.	400 - 1500	U2-4; K7; T1,3,6; Asia, Madagascar	Herb		LEAP
<i>Leptaspis zeylanica</i>	Nees ex Steud.			Herb		
<i>Panicum hirtum</i>	Kam. (Syn. P. heterostachyum Hack.)			Herb		
POLYGALACEAE						
<i>Polygala macrostigma</i>	Chodat	1200	T3,4,6,8;	Herb		LEAP
<i>Polygala sphenoptera</i>	Fresen.	1000 - 2200	U3; K2,3,5-7; T1-8; D.R. Congo, Cameroon, Zimbabwe, Zambia	Herb		LEAP
PTERIDOPHYTA						
<i>Pteridium aquilinum subsp. aquilinum</i>			Global	Fern		

RHAMNACEAE						
<i>Gouania longispicata</i>	Engl.	300 - 2400	U1-4; K3-5,7; T2-4, 6-8; Nigeria, Congo, Sudan, Zimbabwe, Malawi, Mozambique	Climbing or crawling shrub or liane	Forests particularly at margins and in disturbed places, riverine thickets and wooded grassland	FTEA
<i>Helinus integrifolius</i>	(Lam.) Kuntze	0 - 1700	K1,2,4,6,7; T1-7; Yemen, Socotra Somali Republic, Congo, Angola, Malawi, Zimbabwe, Mozambique, South West Africa, South Africa	Woody climber	Thickets in wooded grassland, forest margins, bushland and dry open woody vegetation of all sorts.	FTEA
ROSACEAE						
<i>Rubus rosifolius</i>	Sm.	900 - 1450	U4; T2,3; a native of eastern Asia, introduced into Africa and quite commonly naturalised.	Scrambling shrub	Edges of upland and lowland rain forests na plantations, secondary bushland, abandoned cultivations etc.	FTEA
RUBIACEAE						
<i>Aidia micrantha</i>	(K. Schum.) Bullock ex F. White	1140 - 1800	U2,4; T1,4,6,7; D.R. Congo; Burundi, Malawi, Zambia, Mozambique and E. Zimbabwe.	Shrub or small tree	Evergreen forest and thicket including semi-swamp and riverine forest.	FTEA
<i>Aoranthe penduliflora</i>	(K. Schum.) Somers	250 - 960	T3,6,8; not known elsewhere.	Shrub or small tree	Evergreen forest	FTEA
<i>Bertiera letouzeyi subsp. vel sp. aff.</i>	N. Halle			Shrub		
<i>Canthium oligocarpum subsp. captum</i>	Hiern	1350 - 2000	T3,6,7; Malawi and Mozambique (subsp range)	Shrub or tree	Forest	FTEA
<i>Catunaregam spinosa subsp. taylorii</i>	(Thunb.) Tirveng.	100 - 1915	T1-8; D.R. Congo, Mozambique, Malawi, Zambia and Zimbabwe (sub-species range)	Shrub or small tree	Brachystegia woodland, open bushland and scrub, grassland with scattered trees, sometimes on rocky ground.	FTEA
<i>Chassalia parvifolia</i>	K. Schum.			Shrub		
<i>Chazaliella abrupta</i>	(Hiern) E.M.A. Petit & Verdc.			Shrub		
<i>Coffea canephora</i>	Pierre ex A. Froehner	700 - 1400	U1-3; T1; West Africa, Cameroon, Gabon, D.R. Congo, Sudan and Angola	Tree	Forest. Widely cultivated	FTEA
<i>Coffea pocsiorum</i>	Bridson			Shrub or small tree		
<i>Coffea sessiliflora</i>	Bridson	200	K7 and T6;	Shrub	Forested hillslopes	FTEA
<i>Coffea sp. E of FTEA</i>	L.	500 - 600	T6; known only from one specimen.	Small tree	Dry evergreen forest	FTEA
<i>Cremaspora triflora subsp. confluens</i>	(Thonn.) K. Schum	0 - 700 (1225)	K7; T2,3,6-8; Z; P; ?Malawi, also cultivated in India	Shrub or small tree	Evergreen forest, fringing forest and bush, thicket;	FTEA
<i>Didymosalpinx norae</i>	(Swynn.) Keay	190 - 810	K7; T3,6,8; Mozambique, Zimbabwe.	Shrub or small tree	Evergreen forest, secondary forest, forest edges.	FTEA

<i>Gardenia posoquerioides</i>	S. Moore	250 - 1000	K7; T6; Zimbabwe; also cultivated in Puerto Rico and Florida.	Glabrous shrub or small tree	Evergreen forest, Brachystegia woodland;	FTEA
<i>Geophila obvallata</i>	(Schumach.) Didr.			Herb		
<i>Hallea stipulosa</i>	(DC.) J.-F. Leroy	1050 - 1200	U1,2,4; widespread in W and Central Africa from Senegal to Angola and Sudan to Zambia	Shrub	Swamp forest often forming almost pure stands in E. Africa also in evergreen forest.	FTEA
<i>Ixora tanzaniensis</i>	Bridson	275 - 750	T6; not known elsewhere.	Shrub	Forest	
<i>Keetia gueinzii</i>	(Sond.) Bridson	90 - 2450	U1-4; K2/3, 3-5/7; T1-8; Z; Cameroon, Central African Republic, D.R. Congo, Rwanda, Burundi, Ethiopia, Malawi, Zambia, Zimbabwe, Angola and South Africa.	Shrub or liane	Forest and woodland, often on swampy ground	FTEA
<i>Keetia venosa</i>	(Oliv.) Bridson	275 - 1525	U1,3,4; K7; T 1,3,4,6,8; W. Africa, Cameroon, Central African Republic, D.R. Congo, Rwanda, Burundi, Sudan, Mozambique, Malawi, Zambia, Zimbabwe and Angola.	Shrub or climber	Forest edges and scrub.	FTEA
<i>Kraussia speciosa</i>	Bullock			Shrub		
<i>Lasianthus cereiflorus</i>	E.A. Bruce	1000 - 1700	T6; not known elsewhere.	Shrub	Shrub layer of rain forest.	FTEA
<i>Lasianthus macrocalyx</i>	K. Schum.			Shrub		
<i>Lasianthus microcalyx</i>	K. Schum.			Shrub		
<i>Leptactina platyphylla</i>	(Hiern) Wernham	45 - 1650	U2,4; K5,7; T3,4,6,7,8; Cameroon, Central African Republic, D.R. Congo, Burundi, Rwanda, Sudan, Mozambique, Malawi	Shrub or small tree	Evergreen forest, woodland, secondary bushland.	FTEA
<i>Mitracarpus hirtus</i>	(L.) DC.	0 - 1500	U1-4; K5,7; T1, 3-6; 8; widespread in tropical Africa from Mauritania to Angola, D.R. Congo and Central African Republic, Sudan, Malawi, Zambia, Seychelles and Cape Verde Islands also in India, Burma, Selangor, New Guinea and Narians Is, West Indies and tropica	Herb	Weed in cultivations, pathsides, fallow land, also in secondary scrub and thicket, open dry rocky areas	FTEA
<i>Mussaenda arcuata</i>	Lam. ex Poir.	700 - 1830	U1-4; K3,5,7; T1,3,4,6-8; throughout tropical Africa (excluding Somalia) as far south as	Shrub or climber	Grassland, bushland, open or closed forest, evergreen rain-forest.	FTEA

			Angola and Zimbabwe; Madagascar, Mauritius, and Reunion.			
<i>Mussaenda microdonta</i>	Wernham	1830 - 2100	U3; K4,5; T2,3,6;	Tree	Evergreen forest usually near streams	FTEA
<i>Oldenlandia echinulosa</i> <i>var. pellucida</i>	K. Schum.	900 - 1200	T4,6,8; Sierra Leone, Nigeria, Cameroun, Sudan, Zimbabwe, Angola	Herb	Moist rock outcrops, damp soil by river in gallery forest.	FTEA
<i>Oxyanthus goetzei</i> subsp. <i>keniensis</i>	K. Schum.	610 - 1650	K4,7; T6,3; not known elsewhere.	Shrub	Forest	FTEA
<i>Oxyanthus speciosus</i> subsp. <i>stenocarpus</i>	DC.	750 - 2300	U1-3; K1, 3-7, T2,3,5-8; Rwanda, Ethiopia, Mozambique, Zimbabwe and South Africa	Shrub or small tree	Forest	FTEA
<i>Paederia bojeriana</i>	(A. Rich.) Drake			Climbing shrub		
<i>Pauridiantha paucinervis</i> subsp. <i>holstii</i>	(Hiern) Bremek.	500 - 2400	K3-5,7; T2-4,6,7; D.R. Congo, Malawi and Zambia	Shrub or small tree	Lowland evergreen (including rain)forest, upland evergreen forest.	FTEA
<i>Pavetta</i> aff. <i>Sparsipila</i>	Bremek					
<i>Pavetta crebrifolia</i>	Hiern	400 - 460 (600)	T6; not known elsewhere.	Shrub or small tree	Forest on limestone	FTEA
<i>Pavetta holstii</i>	Schumm.	600 - 2000	T3, 6; nont known elsewhere.	Shrub, scrambling shrub or small tree	Evergreen forest.	FTEA
<i>Pavetta refractifolia</i>	K. Schum.	150 - 1320	T3,5,6,8; not known elsewhere	Shrub	Wooded grassland, riverine thicket and forest	FTEA
<i>Pavetta stenosepala</i> subsp. <i>stenosepala</i>	K. Schum.	0 - 1300 (1800)	K7; T3,6; Z; not known elsewhere.	Shrub	Evergreen forest or thickets and bushland	FTEA
<i>Polysphaeria parvifolia</i>	Hiern	0 - 500	K1,7; T1,3,6,8; Z; P; Sudan, Ethiopia and Somalia	Small tree or shrub	Rather dry evergreen forest, woodland, coastal bushland and scrub, old sisal plantations, cultivations etc	FTEA
<i>Psychotria cryptogrammata</i>	E.M.A. Petit			Shrub		
<i>Psychotria fractinervata</i>	E.M.A. Petit			Shrub		
<i>Psychotria goetzei</i>	(K. Schum.) E.M.A. Petit			Shrub or small tree		
<i>Psychotria lauracea</i>	(K. Schum.) E.M.A. Petit			Shrub or small tree		
<i>Psychotria megistantha</i>	E. Petit			Shrub		
<i>Psychotria pandurata</i>	Verdc.	300 - 1000	T3,6; not known elsewhere.	Herb	Rain forest	FTEA
<i>Rothmannia manganjae</i>	(Hiern) Keay	(230-) 360 - 1800	K3-5; T3,6,8; Mozambique, Malawi and Zimbabwe	Tree	Forest	FTEA

<i>Rothmannia ravae</i>	(Chiov.) Bridson	45 - 960	K7; T3,6,8; Somalia	Shrub or small tree	Thicket or sometimes forest	FTEA
<i>Rothmannia whitfieldii</i>	(Lindl.) Dandy	(700-) 1050 - 1675	U1,2,4; T7,8; throughout west tropical Africa, the D.R. Congo basin, Sudan, Malawi, Zambia and Angola	Shrub or small tree	Forest	FTEA
<i>Rubia cordifolia subsp. conotricha</i>	(Gand.) Verdc.	1140 - 2650	U1-4; K1-6; T1-8; D.R. Congo, Sudan, Somali Republic, Mozambique; Malawi, Zambia, Zimbabwe, Angola and South Africa (mostly Natal and Transvaal)	Herb	Mostly at forest edges, in clearings and thickets or less often in denser forest, open grassland and bushland also in scrubland and rocky gullies	FTEA
<i>Rutidea orientalis</i>	Bridson	800 - 2250	U2-4; K3,5; T1,3,4,6,7; D.R. Congo, Rwanda, Burundi, Mozambique, Malawi and Zimbabwe	Scandent shrub or climber	Forest, frequently at edges or in thickets;	FTEA
<i>Rytigynia cf. Xanthotricha</i>	(K. Schum.) Verdc. fortasse sp. nov.					
<i>Rytigynia eickii</i>	(K. Schumm.& K. Krause) Bullock	950 - 1830	K7; T3,6; not known elsewhere	Shrub or small tree	Open bushland in granite areas, submontane forest	FTEA
<i>Sabicea orientalis</i>	Wernham	775 - 2100	T1,3,4,6,7; Cameroon, ? D.R. Congo, Burundi	Shrub	Rain-forest, streamside forest and forest edges	FTEA
<i>Sericanthe odoratissima var. uluguruensis</i>	(K. Schum.) Robbr.	1100 - 1800	T6,7; Malawi	Shrub or small tree	Rain forest	FTEA
<i>Tarenna pavettoides Sim subsp. Affinis</i>	(Harv.)		T3,6,7,8; P; Mozambique, Malawi, Zimbabwe	Shrub or small tree		LEAP
<i>Tricalysia ovalifolia</i>	Hiern	0 - 1000	K7; T3,6,8; Z; Madagascar, Somalia, Aldabra, Assumption, Comores, Madagascar	Shrub or small tree	Coastal evergreen or mixed formations, secondar vegetation, dry thickets, wooded grassland and evergreen forest	FTEA
<i>Tricalysia pallens</i>	Hiern			Tree		
<i>Tricalysia pedicellata</i>	Robbr.	300 - 700	T6; not known elsewhere.	Shrub or small tree	Forest	FTEA
RUTACEAE						
<i>Vepris morogorensis</i>	(Kokwaro) Mziray			Shrub		
SAPINDACEAE						
<i>Allophylus africanus subsp. griseotomentosus</i>	P. Beauv.	200 - 1800	U1; T1-3,5,6,8; D.R. Congo, Zambia, Malawi, Mozambique and Zimbabwe.	Shrub or tree	Riverine forest, valley thicket	FTEA

<i>Allophylus congolanus</i>	Gilg	500 - 1150	T4,6-8; D.R. Congo, Zambia and Malawi	Shrub or small tree	Grassland with scattered trees or shrubs, lakeside woodland and dry bushland in limestone gorges	FTEA
<i>Allophylus ferrugineus</i> <i>var. stipitatus</i>	Taub.	1000 - 2100	T 2,4,6,7; not known elsewhere.	Tree or shrub	Steep forested ravines, forest edges	FTEA
<i>Allophylus pervillei</i>	Blume	0 - 550	K7; T3,6; Z; P; Madagascar, Comoro Is. and Seychelles	Shrub	Fringing forest, forest clumps, ground water forest, coastal <i>Brachystegia</i> and coral and other limestone, cliff tops.	FTEA
<i>Allophylus rubifolius</i>	(A.Rich.) Engl.	0 - 2250	U1-5; K1-7; T1-8; E. D.R. Congo, Sudan, Ethiopia and N. Somalia, south to South Africa.	Shrub or small tree	Grassland with scattered trees, rough grassland, thicket edges of cultivation, woodland sometimes riverine	FTEA
<i>Deinbollia borbonica</i>	Scheff.	0 - 1050	K4,7; T2,3,5-8; Z; P; S. Somalia, Malawi, Mozambique and Comoro Is.	Shrub or small tree	Riverine acaecia thorn bush and evergreen thicket. Combretum -Acacia woodland, low evergreen forest on limestone outcrops	FTEA
SAPOTACEAE						
<i>Manilkara sp.</i>						
<i>Mimusops fruticosa</i>	A. DC.	0 - 750	K7; T3,6,8; Z; P; Mozambique and Zimbabwe, also Comoro Is and Madagascar	Shrub or small tree	Lowland dry evergreen forest, riverine forest and coastal evergreen thickets.	FTEA
<i>Mimusops obtusifolia</i>	Lam.			Tree		
<i>Omphalocarpum strombocarpum</i>	Y.B. Harv. & Lovett			Tree		
<i>Synsepalum brevipes</i>	(Bak.) Pennington	0 - 1500	U2,4; K4,5,7; T1,3,4,6-8; Z; P; widespread in tropical Africa from Portuguese Gambia to the Sudan Republic and south to Angola, Zambia, Angola, Zambia, Malawi, Mozambique and Zimbabwe	Small to medium tree	Lowland rain forest and riverine forest, commonly found on river banks and margins of lakes or other such sites with a high permanent water table.	FTEA
SCROPHULARIACEAE						
<i>Halleria lucida</i>	L.	1000 - 2500	U1; K1,3-6; T1,2,6; Ethiopia	Tree		LEAP
SIMAROUBACEAE						
<i>Brucea tenuifolia</i>	Engl.	650 - 1350	U4; T3,6; not known elsewhere.	Shrub	Rainforest	FTEA
SOLANACEAE						
<i>Solanum richardii</i>	Dunal	80 - 1000	T3,6; Z; P	Shrub		LEAP
<i>Solanum schumannianum</i>	Dammer, forma	1450 - 2320	K4,6,7; T2,3,6,7	Small shrub		LEAP
<i>Solanum terminale</i>	Forssk	1050 - 2300	U2,4; T3,4,8; Rwanda, Burundi	Shrub		LEAP
<i>Solanum zanzibarense</i>	Vatke	100 - 750	K7; T6,8; Z;	Shrub		LEAP

STERCULIACEAE						
<i>Cola stelechantha</i>	Brenan	500 - 1500	K7; T6	Tree		LEAP
<i>Dombeya acutangula</i>	Cav.		T2,3,5;	Shrub		LEAP
<i>Dombeya shupangae</i>	K. Schum.	600	T2,3,4; Madagascar	Tree		LEAP
<i>Leptonychia usambarensis</i>	K. Schum.			Tree or shrub		Not in LEAP
<i>Theobroma cacao</i>	L.			Tree		
THYMELAEACEAE						
<i>Peddiea subcordata</i>	Domke			Shrub		
<i>Synaptolepis alternifolia</i>	Oliv.			Shrub		
TILIACEAE						
<i>Grewia goetzeana</i>	K. Schum.	150 - 950	T3; ?5,6,8 not known elsewhere	Tree	Forest including riverine and secondary, rarely wooded grassland	FTEA
<i>Triumfetta cordifolia</i>	A. Rich.	900 - 2650	U2,4; K3; T1,4,7; Nigeria Cameroon, Congo (Brazzaville), Central African Republic, Burundi, Angola and Zimbabwe	Shrub	Edges and clearings of wet forest or in marshy areas, mostly at high elevation in western most part of E. Africa	FTEA
<i>Triumfetta rhomboidea</i>	Jacq.		U1-4; K1-7; T1-8; Z; P; Pantropical	Annual herb	Weed of cultivation but also occurring in disturbed areas of wild	FTEA
ULMACEAE						
<i>Celtis philippensis</i>	Blanco	30 - 1200	U2,4; K7; T3,6,8; Z; Ethiopia to West Africa and south to Angola and Mozambique, also Madagascar, Mascarene Is and tropical Asia to Australia	Tree or shrub	Lowland rain, swamp and riverine forest.	FTEA
<i>Trema orientalis</i>	(L.) Blume	0 - 2100	U1-4; K1,3-7; T1-8; Z; P; throughout Africa south of the Sahara, Madagascar, Mascarene Isl and tropical Asia	Shrub or tree	Margins of lowland and upland rainforest, often a pioneer in clearings, also riverine forest.	FTEA
URTICACEAE						
<i>Elatostema paivaeanum</i>	Wedd.	900 - 2100	T2,3,6,7; widespread in the wetter parts of tropical Africa, west to Guinee south to Malawi	Herb	Lowland rain forest or altitudinal transitional forest, in the moist ground cover, often along streams.	FTEA
<i>Laportea lanceolata</i>	(Engl.) Chew	50 - 900	K7; T3,6; ? E. D.R. Congo	Herb	Lowland rain forest, frequently sprawling over rocks in clearings or as forest edge, also on rocks in moist woodland.	FTEA
<i>Obetia radula</i>	(Bak.) B. D. Jackson	700 - 2000	U2-4; K1,3,4,3/6, 5,7; T1-3,6; E. D.R. Congo, Rwanda, Burundi, Madagascar	Tree	Local on rocky hillsides in evergreen or semi-evergreen bushland, (chiefly on hills of the basement complex, less	FTEA

					commonly on basalt and lava), sometimes at rocky lake and river shores and at margins of dry montane forest.	
<i>Pilea holstii</i>	Engl.	200 - 1400	K7; T3, 6; E. D.R. Congo	Herb	In lowland rain forest	FTEA
VERBENACEAE						
<i>Clerodendrum cephalanthum</i>	Oliv.	0 - 1950	K7; T3, 6-8; Z; Malawi, Mozambique, Zambia and Zimbabwe	Shrub	Wooded grassland, coastal forest and bushland, evergreen forest	FTEA
<i>Clerodendrum pleiosciadium</i>	Gurke	200 - 1200	T3,6,8; Malawi, Mozambique, Zimbabwe	Shrub or erect herb	Forest, woodland, cultivated land and regenerating forest	FTEA
<i>Clerodendrum rotundifolium</i>	Oliv.	300 - 2130	U1-4; K3-6; T1-3,5,6; D.R. Congo, Burundi, Sudan, Malawi and Mozambique	Shrub	Acacia savanna, combretum bushland, rocky places, stream banks, scrub, anthills in dred parts of swamps. Also in cleared rain forest.	FTEA
<i>Lantana viburnoides</i>	(Forssk.) Vahl		U1; K1-7; T1-8; Z; P; Arabia, Egypt, Ethiopia, Somalia, Zimbabwe, Zambia, Malawi, Mozambique and Angola.	Shrub	Bushland	FTEA
<i>Vitex ferruginea subsp. amboniensis</i>	(Gurke) Verdc.			Tree		
VIOLACEAE						
<i>Rinorea arborea</i>	(Thouars) Baill.	0 - 850	K7; T3,6,8; Z; Mozambique, Madagascar	Shrub or small tree	Lowland evergreen forest	FTEA
<i>Rinorea elliptica</i>	(Oliv.) Kuntze	50 - 600	K7; T2,3,6,8; Mozambique, Malawi	Shrub or small tree	Lowland evergreen rain forest	FTEA
<i>Rinorea ilicifolia var. amplexicaulis</i>	Grey-Wilson	1150	T1,4,6 not known elsewhere.	Shrub or small tree	Evergreen forest	FTEA
<i>Rinorea squamosa subsp. kaessneri</i>	(Engl.) Grey-Wilson	30 - 450	K7; T6; not known elsewhere	Shrub or small tree	Evergreen lowland and submontane forest.	FTEA
VITACEAE						
<i>Cayratia gracilis</i>	(Guill. & Perr.) Suss.	300 - 1770	K1,3-5,7; T1-8; Z; Senegal to Cameroon, Mali, D.R. Congo, Rwanda, Burundi, Sudan Ethiopia, Malawi, Zambia, Zim., Moz., S. Africa, Namibia and Yemen	Trailing herb	Tall grassland with scattered trees, forest margins, swampy areas and streamside forest	FTEA
<i>Cayratia ibuensis</i>	(Hook. f.) Suss.	100 - 1490	U1-4; K?2,5,7; T1, 6,8; Nigeria, Cameroon, Central African Republic, Burundi, D.R. Congo, Egypt, Sudan, Zambia, Malawi,	Herb	Edge of small forest patches and derived thickets, cleared land, old termite mounds, sandy river banks, Papyrus swamps, sometimes a weed.	FTEA

			Zimbabwe, Mozambique and Angola			
<i>Cissus sciaphila</i>	Gilg.	0 - 450	K7; T3,6,8; Z; P; not known elsewhere	Climber	Lowland forest, riverine forest fringes, woodland slopes above river valleys.	FTEA
<i>Cyphostemma braunii</i>	(Gilg & Brandt) Descoings	100 - 1950	K7; T3,6; not known elsewhere	Climber	Basically evergreen forest, Podocarpus, Ocotea, etc also secondary bush and scrub in old plantations, rocky areas with small trees and shrubs in rain forest clearings	FTEA
<i>Cyphostemma buchananii</i>	(Planch.) Wild & Drummond	0 - 1125	K7; T3-8;Z; D.R. Congo, Malawi, Mozambique, Zambia, Zimbabwe, Botswana and South Africa.	Herb	Coastal thicket on old coral reefs, etc, bushland, wooded grassland, woodland, forest also in old cultivations.	FTEA
<i>Cyphostemma kirkianum</i>	(Planch.) Wild & Drummond	0 - 900	K7; T2,3,6; Z; P; Mozambique, Malawi, Zambia and Zimbabwe	Climbing herb	Rainforest, lowland evergreen forest on coral, Casuarina woodland.	FTEA
ZINGERBERACEAE						
<i>Costus subbiflorus</i>	K. Schum.	300 - 1070	T3,4, 6; not known elsewhere	Herb	Riverine forest	FTEA
<i>Renealmia engleri</i>	K. Schum.	900 - 1100	K5; T3,6; not known elsewhere	Herb	Rain forest	FTEA

Key to Appendix I

Author

Altitudinal range (m)

This refers to the known range of altitudes from which this species has been recorded.

Distribution

The distribution records are based on the geographical divisions used by the Flora of Tropical East Africa (available at <http://www.rbgh.org.uk/herbarium/fta/geograph.html>). Names of countries are the same as those given in the FTEA. As this has been published over several decades it includes a number of country names which have subsequently been changed e.g. Nyassaland is now Malawi etc.

Where the subspecies or variety is listed, the distribution refers to the sub-species or variety not the species.

Habitat

This describes the habitats in which this species is found.

Data source

Three data sources were used for information on the altitudinal range, distribution and habitat association.

- FTEA: The Flora of Tropical East Africa was the preferred data source. The FTEA is a series published by the Royal Botanic Gardens, Kew. Descriptions are not yet available for all families.
- LEAP: The List of East African Plants is published by the East African Herbarium.

- TROPICOS provides new and improved access to the Missouri Botanical Garden's VAST nomenclatural database and associated authority files. Generally this was only used in combination with either FTEA or LEAP

